



J.R. Simplot Company
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July 8, 2019

**SENT VIA EMAIL TO: lredmo@sbtribes.com; Hladick.christopher@Epamail.epa.gov;
jruhs@blm.gov**
PAPER COPIES TO FOLLOW VIA UPS OVERNIGHT DELIVERY

Mr. Ladd Elmo
Chairman, Fort Hall Business Council
Shoshone Bannock Tribes
PO Box 306
Fort Hall, ID 83203

Mr. Chris Hladick
Administrator
EPA Region 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101

Mr. John Ruhs
Idaho State Director
Bureau of Land Management
1387 S. Vinnell Way
Boise, ID 83709

Dear Messrs. Elmo, Hladick and Ruhs:

Approximately a year ago, a visit was made to the Gay Mine by representatives from EPA, BLM, FMC Corporation and the J.R. Simplot Company (Simplot) to discuss with the Shoshone Bannock Tribes the status of reclamation and potential actions to address releases of selenium from the historical mining that occurred. Since that tour, there have been a number of discussions about potential actions. Attached is a compilation of proposals and documents from the past two decades on potential reclamation and remedial actions. It is hoped that this list can be the starting point for discussions on actions to take.

The Gay Mine played an integral role in Simplot's phosphate operations in southeastern Idaho; we are committed to working on improvements to the environment at the Gay Mine. I look forward to hearing from you on your organizations' interest in further steps to identify projects for timely implementation.

Sincerely,



Alan L. Prouty
Vice President, Environmental & Regulatory Affairs

Attachment

C: (w/attachment)

Mary D'Aversa, BLM/Idaho Falls
Lizanne Davis, FMC Corp.
Nathan Small, Fort Hall Business Council
Congressman Simpson, U.S. House of Representatives

Introduction

During the approximately the past two decades, there have been reclamation plans prepared and discussions of potential actions to address releases of selenium from historical mining at the Gay Mine. In 1997, the BLM and BIA completed a detailed review of reclamation at the Gay Mine, which was coordinated with the J.R. Simplot Company (Simplot) and the FMC Corporation (FMC). A proposal was provided to the Shoshone Bannock Tribes (Tribes) in 1997. Unfortunately, agreement necessary to implement this work was not achieved.

To address selenium releases, there were discussions on backfilling and eliminating several pit lakes that had elevated concentrations of selenium. Similar to the reclamation plan, agreement was not achieved on implementing this work. However, in 2010, after several years of negotiations, Simplot and FMC entered into an Administrative Settlement Agreement and Order on Consent with the EPA and the Tribes obligating the companies to conduct a Remedial Investigation and Feasibility Study at the Gay Mine. Since the signing of the Agreement, some investigative work has occurred at the Gay Mine.

During 2018, there were multiple meetings/discussions in regards to potential actions at the Gay Mine. During a visit by the EPA Region X Administrator, the removal of pit high walls was discussed at length. Other projects discussed in 2018 included pit lake mitigation, stream removal, removal of unwanted fences, removal of the powder magazine, and removal of the Willow Creek crossing.

This document summarizes these previous proposals and ideas on reclamation or actions to address selenium releases. It is hoped that such a summary could be used to establish a framework for the initiation of environmental improvements at the Gay Mine.

Projects

1. Reclamation

In 1997, the BLM and BIA completed a detailed review of reclamation at the Gay Mine which was coordinated with Simplot and the FMC Corporation (FMC) and resulted in a list of agreed upon reclamation items. Attachment 1 is a July 1, 1997 document outlining the companies' commitments and the Tribes' responses which laid the ground- work to the May 1, 1998 commitment letter. Attachment 2 is the May 1, 1998 commitment letter. Below is a summary of the proposed reclamation items:

- General cleanup of the Headquarters Area;
- Ripping and seeding of the old airstrip, land farm, and ore pads for B-1 and B-4;
- Installing water bars on roads to limit erosion;
- Installing fencing above the A-12 high wall;
- Grading and seeding gravel pit, if no longer wanted by tribes;

- Continued land farming hydrocarbon impacted soil (completed);
- Ripping and seeding C-8 dump and slope or fence C-9 high wall;
- Demolishing the powder magazine;
- Flattening grading and seeding the mill shale pile west of I-pit;
- Removing fencing from R pit tests plots (in process);
- Horizontally ripping and seeding northwest fill area of T-2 Pit;
- Repairing sinkhole on HH and OO haul road (completed);
- Repairing sinkhole near JG Pit;
- Flattening, grading and seeding waste pile in the bottom of JD-pit;
- Remove Willow Creek culvert and create rock lined crossing
- Weed control on reclaim;
- Building a park as agreed to with the Tribes;
- Reestablishing survey control (completed);
- Monitoring vegetation on reclaim for two years; and,
- Conducting surface water sampling and analysis spring and fall 1997 (completed).

Unfortunately ultimate agreement from the Tribal Council was not reached on this 1998 commitment and most of those reclamation items were not completed. Simplot understands that BLM has provided the Tribes with an updated reclamation plan for Gay Mine. Simplot has not had any interaction with BLM or the Tribes in regards to the potential revised proposal. Simplot believes that work should go forward to verify the elements of the original 1997 proposal and to discuss additional tasks identified during the meetings in June, 2018 between the Tribes, EPA Regional Administrator, BLM and FMC, and; the recent conversations between the Tribes and BLM concerning the updated reclamation plan for Gay Mine.

2. Fence Removal and Minor Reclamation Tasks

Reclamation tasks were also discussed in a meeting that Simplot and FMC participated in with EPA, BLM and the Tribes in June 2018. At this meeting, the companies reiterated our commitment to reasonable reclamation actions at the Gay Mine. Potential tasks that were discussed included removal of unwanted fences, and removal of Willow Creek crossing (see Attachment 3). Work plans could be developed for these reclamation activities and implemented after appropriate approval.

3. Pit Lake Mitigation

FMC and Simplot commissioned a study in 2000 with Brown and Caldwell to reclaim and backfill some of the pit lakes at Gay Mine. The plan included backfilling four pits with lakes including A-12 in the headquarter areas, OP in the north limb, JF in the South 40 area and the Z pit in the East Limb. Attachment 4 provides the location of these pit lakes and Attachment 5 has the specific proposal. Such a project could be a CERCLA early action.

4. Stream Diversion

Another potential CERCLA early action is to divert water from entering a pit lake that is

located in the Headquarters area (A-12). The water is fed by a spring that is not impacted with selenium and the water collects in a lake then discharges over an impacted area which causes the water to have elevated levels of selenium. The ultimate goal would be to eliminate a source of selenium impacted water to this pit. [Note: if this stream diversion does occur, the pit lake mitigation discussed previously for A-12 may not be necessary.] FMC and Simplot are reviewing an Engineering Evaluation and Cost Analysis Plan for this potential project.

5. Mine Pit High Wall Removal

At the June 2018 meeting with EPA, FMC and Simplot, the Tribes expressed their desire to have pit high walls removed at the Gay Mine. Modifications to certain pit high walls were included in the Year 2000 Pit Lake Mitigation proposal (Attachment 5). As expressed at the June 2018 meeting, Simplot is willing to further discuss with the Tribes reclamation ideas for the mine pit high walls.

Next Steps

Simplot proposes, that along with the Tribes, the appropriate agencies and FMC, the following occur:

- That a project list be prepared from this document and others of actions that there is an agreement to move forward with.
- For each of these projects, the major steps necessary to make the project happen are identified; this includes not only the technical and engineering work, but also the administrative authority and associated regulatory requirements.
- Then, as the applicable regulations require, work plans are developed and associated regulatory processes are followed to implement the agreed upon projects.

Simplot is committed to working with the Tribes, the applicable agencies and FMC to move forward with environmental improvement projects at the Gay Mine.

Attachment 1

1997 Gay Mine Reclamation Proposal

**1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997**

**FMC Corporation and J.R. Simplot
Company Proposed 1998 Reclamation**

**Sho-Ban Tribes, Bureau of Land
Management, and Bureau of Indian
Affairs Responses**

Reclamation work planned by FMC Corporation and J.R. Simplot Company ("the Companies") initially for the summer/fall of 1998:

1. The Companies will complete general cleanup around office, tipple and support building area. The cleanup will include wood debris (pallets), trash, (paper, rubber parts, etc.), tramp metal, and old tires (tire shop). The two shovels will also be removed from the property. The Sho-Ban Tribes previously identified all of the structures (buildings, tipple, box car, water tanks) that are currently standing to remain intact.

Response: If the two shovels are not removed in an expedient manner, can the tribe assume ownership? We need a final resolution on which structures will or will not remain intact. Rob Hartman from FMC will follow up on specific contingencies involving reclamation of the office and tipple site area. Concern was expressed by Councilman Farmer that in reviewing which buildings should be removed, the tribes should be farsighted in looking at potential uses for this area. He indicated that this area may have some potential as a winter sports (e.g. cross country skiing) training or recreation facility, and the remaining structures should be looked at with opportunities such as these in mind.

2. The road up to the ore pads, ore pads (b-1 and B-4), old airstrip and landfarm area will be ripped and seeded when the landfarm operation is completed. "B" seed mix will be used for all seeding reference herein.

Response: The road to the "Land Farming" area may need to remain open. Noting this exception the proposed reclamation in item 2 is accepted.

3. The Companies strongly suggest that water bars be installed only where significant erosion of reclaimed roads by runoff has been observed, and will work with the BLM/BIA to address specific areas suffering excessive erosion.

Response: This reclamation should be phased in after access is no longer needed for reclamation or for other purposes. Some of the berms blocking old roads need to be reestablished. Additionally, the main road to the mine may require some repairs (additional gravel base) where soft spots or "blow out" areas are occurring.

4. The Companies are willing to install fencing (3-strand barb-wire) along the south/east highwall at A-12 pit.

Response: Fencing needs to be evaluated. Four strand, "buck and pole" or berming along certain parts of the A 12 Pit highwall. Tribes will follow up with a final recommendation.

1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997

5. The Companies understand that the Sho-Ban Tribes want to keep the gravel pit accessible for road maintenance use; if this is no longer the case, the gravel pit area will be graded and seeded.

Response: Sho-Ban/BLM/BIA follow-up required. Land status (allotted or unallotted) needs to be determined and a recommendation from the Tribes on closure of the pit needs to be made before rehabilitation can proceed.

6. Continue/complete landfarming, including addition of minor additional oil-stained soil from small area east to tipple where equipment was salvaged.

Response: Proceed as proposed.

7. The companies will rip and seed C-8 dump. The remaining highwalls were to be sloped or fenced which has not been completed. The Companies will install a fence (3-strand barb-wire) along the east highwall fo C-9 pit.

Response: Type of fencing along the east highwall of the C-9 pit needs to be evaluated in relation to human activities and livestock use in the area (same as item 4). With the exception of fencing the Companies may proceed with proposed reclamation of the C-8 dump.

8. Upon notification from the Tribes that the materials have been removed and that the Tribes do not want to retain the structure (shack), the Companies will reclaim the powder magazine area. As the Companies want to complete work during 1998, a decision by the Tribes to remove their materials and to retain or demolish the structure needs to be communicated to the companies in the near future. In the absence of notification, the Companies will not conduct any work in this area.

Response: Remove the shack, but the powder magazine shall be left intact. The Tribes will follow up on maintenance, future use of the structure and an evaluation of its present contents.

9. The mill shale pile to the west of the haul road (west of old I-pits) will be flattened (pushed out), graded and seeded.

Response: This will require BLM to update/amend the present map (if needed) on mill shale stockpiles as a follow up item. The Companies may proceed with this reclamation as proposed.

10. The Companies agree to remove and salvage or dispose of the fencing remaining from the old test plot near the R pits.

Response: Proceed as proposed.

11. The Companies will horizontally rip and seed the northwest fill area of the T-2 pit.

Response: Proceed as proposed.

**1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997**

12. The Companies will repair (fill) the sinkhole in the haul road between HH and OO allotments.

Response: Proceed as proposed.

13. The Companies will repair (fill) the sinkhole in the haul road near JG pit.

Response: Proceed as proposed.

14. The Companies will grade (flatten to 3:1 slope), rip and seed the waste piles in the bottom of JD pit (north and south ends).

Responses: It is presently understood that the Companies will conduct a review of the final approved mine plan for the JD pit. Dependent on the findings of the review, the Companies may reformulate their proposal for the JD pit. Field review (BLM, BIA and the Tribes) of the present reclamation status of this area concluded that further work needed to be completed.

15. The Companies will remove the Willow Creek culvert and create a rock-lined channel. This will eliminate further use of the haul road.

Response: The Companies may proceed as proposed. Sho-Ban Tribes need to identify alternative access routes if need in this area prior to elimination of the haul road.

16. The Companies will eradicate weed infestations that are identified in reclaimed/revegetated mine pit, dump and haul road areas; however, the Companies are not responsible for weed control along permanent roadways (Baker Canyon Road).

Response: Permanent roadways need to be initially treated at least once to assure these areas do not provide a seed dispersion source. BIA will follow up with the necessary coordination to assure treatment along permanent roadways.

17. The Companies will fulfill the agreement with the Tribes with respect to the park.

Response: Site plan needs to be developed before the Companies can proceed with this item. BLM will coordinate with the Tribes in the development and approval of a site plan. FMC needs to provide a cost target prior to the development of a site plan (we understand this was previously negotiated).

1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997

18. The Companies agree to reestablish survey control points and monumentation where needed.

Response: BLM needs to follow up with cost estimates for a reimbursable agreement. The Companies have also agreed to review their records for any pertinent survey information.

19. The Companies agree to monitor the success of revegetation for two growing seasons after seeding.

Response: Revegetation needs to be monitored until successful. BLM will follow up with criteria to determine when an area has been successfully revegetated.

20. Conduct surface water sampling and analysis (pit water and streams) for potential selenium (spring and fall 1997).

Response: Water sampling needs to include selenium and other potential contaminants. The companies shall also conduct water sampling consistent with guidelines developed by the Selenium Working Group.

Attachment 2
1998 BLM Proposal



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Pocatello Resource Area

1111 N. 8th Ave.

Pocatello, ID 83201

In Reply Refer To:

3000

May 1, 1998

Mr. Arnold Appenay, Chairman
Fort Hall Business Council
Box 306
Fort Hall, Idaho 83203

Dear Chairman Appenay:

Attached is a resolution for consideration by the Shoshone-Bannock Business Council, which is necessary to initiate reclamation activities associated with the Gay Mine. Also attached are the Gay Mine reclamation proposals submitted by Simplot and FMC Corporations (the Companies). Included in this same document dated July 1, 1997, is the collective direction from the Shoshone-Bannock Tribes, BLM and BIA concerning how each of the Companies proposals should proceed to be initiated.

As you are probably aware, the Companies reclamation proposals, along with the direction provided by the Tribes and the agencies (BLM and BIA) represents an effort that was started nearly two years ago. Recognizing that most of the reclamation proposals are seasonally constrained in the winter, it would expedite our 1998 reclamation efforts to receive Business Council approval of the attached resolution at the earliest possible date. The Companies have also expressed their motivation to get started as soon as possible with the on-the-ground phase of the Gay Mine reclamation.

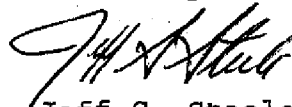
Although the Tribes and agencies have worked very effectively in the preparation and review of the reclamation recommendations and proposals for the Gay Mine, it is suggested the Business Council consider designating a representative(s) as a point of contact for the Tribes. Ideally, this representative(s) working jointly with his/her agency counterparts would; 1) oversee day to day reclamation activities, 2) assure compliance with applicable reclamation plans and 3) prepare recommendations to the Land Use Commission and/or Business Council as to the completion or needed amendment of specific reclamation plans or proposals. The Companies have also expressed the need for a focused point of contact with the tribes.

Also requested within the Resolution is approval of the report entitled "Status of Reclamation Compliance at Gay Mine". Although this report represents a comprehensive review of the reclamation status of the Gay Mine, it should be noted that issues associated with selenium contamination surfaced shortly after the field analysis for this report was completed. As the Pocatello Resource Area Manager it is my recommendation that the study and remediation of selenium toxicity for the Western Phosphate Field as a whole, be deferred to the Selenium Working Group.

At this point, I am extremely pleased at the progress we have made toward the final reclamation of the Gay Mine. We will also continue to work with the Companies on those remaining recommendations not fully addressed in the 1998 proposal. I would like to express my appreciation to the Land Use Commission members and those on the Business Council who have supported us in this effort.

If I can be of assistance in presenting the attached 1998 reclamation proposals to the Business Council, please let me know (ph. 236-6860).

Sincerely,



Jeff S. Steele
Area Manager

Enclosures

cc: Tony Galloway Sr.
Larry Bagley
Hobby Hevawah
Claude M. Broncho
Rob Hartman
Larry Raymond
Dave Koehler
Sam Hernandez
Genevive Edmo
Chad Colter
Richard Thompson

RESOLUTION

WHEREAS, FMC Corporation and J.R. Simplot Company ("the Companies") have submitted their reclamation proposal for the Gay Mine for the summer and fall of 1998. The Companies proposal has been reviewed by members of the Land Use Policy Commission, Fort Hall Business Council and representatives of the Bureau of Land Management (BLM) and Bureau of Indian Affairs (BIA). The Companies 1997 reclamation proposal and response from the Shoshone-Bannock Tribes, BLM and BIA is attached to this resolution and is now being submitted for consideration and approval by the Fort Hall Business Council, and,

WHEREAS, F.A. (Sam) Hernandez has been continually involved as the representative for the BIA and Richard D. Thompson has acted on behalf of the Land Use Policy Commission on matters involving the Gay Mine reclamation, and,

WHEREAS, BLM and BIA staffs have prepared a Final Report entitled STATUS OF RECLAMATION COMPLIANCE AT THE GAY MINE, now,

THEREFORE, BE IT RESOLVED BY THE BUSINESS COUNCIL OF THE SHOSHONE-BANNOCK TRIBES, that the Companies be notified and directed by BLM to proceed with the 1998 reclamation of the Gay Mine consistent with the provisions and direction provided in the Gay Mine Reclamation Proposal dated July 1, 1997 (attached). Authorization is also given to the BLM and BIA to proceed with the coordination and follow-up actions described in the July 1, 1997, reclamation proposal, and,

BE IT FURTHER RESOLVED, that F.A. (Sam) Hernandez and Richard D. Thompson will act as representatives on behalf of the BIA and the Land Use Policy Commission of the Shoshone-Bannock Tribes as points of contact for the Companies in regard to the proposed 1998 Gay Mine Reclamation activities, and,

BE IT FURTHER RESOLVED, that the Final report entitled STATUS OF RECLAMATION COMPLIANCE AT THE GAY MINE be approved and adopted by the Fort Hall Business Council. This report shall be used as the basic source document from which to negotiate and assess the final reclamation of the Gay Mine.

Authority for the foregoing resolution is found in the Indian Reorganization Act of June 18, 1934 (948 Stat. 984), as amended, and under the Constitution and Bylaws of the Shoshone-Bannock Tribes of the Fort Hall Reservation, Idaho; and under the inherent regulatory power of the Tribes over off-Reservation treaty hunting and fishing rights, as reserved in the 1868 Fort Bridger Treaty, and as implemented in the 1975 Tribal Game Code, as amended.

Dated this ___ day of May, 1998.

Chairman Arnold Appenay
Fort Hall Busuiness Council

SEAL

CERTIFICATION

I HEREBY CERTIFY, that the foregoing resolution was passed while a quorum of the Business Council was present by a vote of ___ in favor (), ___ opposed (), ___ absent () and ___ not voting () on the date this bears.

Tribal Secretary Darrell Shay
Fort Hall Business Council

**1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997**

**FMC Corporation and J.R. Simplot
Company Proposed 1998 Reclamation**

**Sho-Ban Tribes, Bureau of Land
Management, and Bureau of Indian
Affairs Responses**

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Response: If the two shovels are not removed in an expedient manner, can the tribe assume ownership? We need a final resolution on which structures will or will not remain intact. Rob Hartman from FMC will follow up on specific contingencies involving reclamation of the office and tipple site area. Concern was expressed by Councilman Farmer that in reviewing which buildings should be removed, the tribes should be farsighted in looking at potential uses for this area. He indicated that this area may have some potential as a winter sports (e.g. cross country skiing) training or recreation facility, and the remaining structures should be looked at with opportunities such as these in mind.

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Response: The road to the "Land Farming" area may need to remain open. Noting this exception the proposed reclamation in item 2 is accepted.

3. The Companies strongly suggest that water bars be installed only where significant erosion of reclaimed roads by runoff has been observed, and will work with the BLM/BIA to address specific areas suffering excessive erosion.

Response: This reclamation should be phased in after access is no longer needed for reclamation or for other purposes. Some of the berms blocking old roads need to be reestablished. Additionally, the main road to the mine may require some repairs (additional gravel base) where soft spots or "blow out" areas are occurring.

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**1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997**

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9. The mill shale pile to the west of the haul road (west of old I-pits) will be flattened (pushed out), graded and seeded.

Response: This will require BLM to update/amend the present map (if needed) on mill shale stockpiles as a follow up item. The Companies may proceed with this reclamation as proposed.

10. The Companies agree to remove and salvage or dispose of the fencing remaining from the old test plot near the R pits.

Response: Proceed as proposed.

11. The Companies will horizontally rip and seed the northwest fill area of the T-2 pit.

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**1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997**

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Response: Permanent roadways need to be initially treated at least once to assure these areas do not provide a seed dispersion source. BIA will follow up with the necessary coordination to assure treatment along permanent roadways.

17. The Companies will fulfill the agreement with the Tribes with respect to the park.

Response: Site plan needs to be developed before the Companies can proceed with this item. BLM will coordinate with the Tribes in the development and approval of a site plan. FMC needs to provide a cost target prior to the development of a site plan (we understand this was previously negotiated).

1998 GAY MINE RECLAMATION PROPOSAL
JULY 1, 1997

18. The Companies agree to reestablish survey control points and monumentation where needed.

Response: BLM needs to follow up with cost estimates for a reimbursable agreement. The Companies have also agreed to review their records for any pertinent survey information.

19. The Companies agree to monitor the success of revegetation for two growing seasons after seeding.

Response: Revegetation needs to be monitored until successful. BLM will follow up with criteria to determine when an area has been successfully revegetated.

20. Conduct surface water sampling and analysis (pit water and streams) for potential selenium (spring and fall 1997).

Response: Water sampling needs to include selenium and other potential contaminants. The companies shall also conduct water sampling consistent with guidelines developed by the Selenium Working Group.

GAY MINE

GRASS SEED MIX "B"

LOT NO. CB-1265

<u>PLS. LBS./AC.</u>	<u>KIND</u>	<u>PURE SEED IN MIX</u>	<u>GERM.</u>
6 lbs.	Fairway Crested W.G.	15.25%	90%
6 lbs.	Greenar Intermed. W.G.	15.07%	91%
5 lbs.	Luna Pubescent W.G.	12.42%	92%
2 lbs.	Sodar Streambank W.G.	5.21%	88%
2 lbs.	Magnar Basin Wild Rye	5.26%	87%
2 lbs.	Ranger Alfalfa Innoc.	5.15%	89%
10 lbs.	Eski Sanfoin	28.21%	81%
2 lbs.	Delar Small Burnett	5.15%	89%
1 lb.	Antelope Bitter Brush	2.67%	86%
1/2 lb.	Saskatoon Service Berry	1.31%	88%

OTHER CROP: 0.87%

INERT MATTER: 3.27

WEED SEED: 0.16%

SEEDING RATE: 43.80 Bulk Pounds to Supply 36.5 P.L.S. Pounds

BAG WT. 50 lbs. NET

P.O. NUMBER: 55092

BLENDED BY: GRASSLAND WEST COMPANY

CLARKSTON, WA. 99403

(509) 758-9100

4. There will be two seed mixes, a range seed mix and a wildlife seed mix. The wildlife seed mix is listed in Table 5.1-6 (page 5-17) of the EA, except substitute 24 lbs/acre sanfoin rather than 2 lbs/acres of sanfoin. The wildlife seed mix will be used on the following areas: the north faces of JD and JG dumps, the backfilled JG pit, and the west side of backfilled pits JD, JF-1, and JF-2 as shown on the Reclamation Map in the mine plan. The wildlife seed mix will be planted in rows with the Brillion seeder packer. This seeding shall consist of alternating rows of grasses and rows of forbs and shrubs. The range seed mix listed in the mine plan will be sown on all other disturbed areas and will be applied by broadcasting. Seeding shall be done on the contour. Alfalfa shall not be used in the reclamation seed mix unless otherwise expressly approved.

5. All mine pit access roads and the main haul road not retained as part of the BIA Fort Hall road system shall be

Table 5.1-6 Seed Mix A, Proposed for Permanent Revegetation of the GMEA-1, 1986.

Species			Application ^{1/} Rate (lbs PLS/ac)
Scientific Name	Common Name	Variety	
GRASSES:			
<u>Agropyron cristatum</u>	Fairway crested wheatgrass	Parkway	3
<u>Agropyron smithii</u>	Western wheatgrass	Arriba, Barton, Rosana	2
<u>Agropyron spicatum</u>	Bluebunch wheatgrass	Whitmar	1-1/2
<u>Agropyron trachycaulum</u>	Slender wheatgrass	Primar	2
<u>Elymus cinereus</u>	Basin wildrye	Magnar	1
<u>Festuca ovina</u>	Hard sheep fescue	Durar	2
<u>duriuscula</u>			
<u>Poa ampla</u>	Sherman big bluegrass	Sherman	2
			<u>13-1/2</u> lbs
FORBS:			
<u>Astragalus cicer</u>	Cicer milkvetch	Lutana Monarch	3
<u>Balsamorhiza sagittata</u>	Arrowleaf balsamroot	--	1/2
<u>Hedysarum boreale</u>	Northern sweetvetch	--	1
<u>Linum lewisii</u>	Lewis flax	Appar	3
<u>Onobrychis viciaefolia</u>	Sainfoin	Eski	2 1/4
<u>Sphaeralcea</u>	Gooseberry globemallow	--	1/4
<u>grossulariaefolia</u>			<u>9-3/4</u> lbs
			2 1/4
SHRUBS:			
<u>Amelanchier alnifolia</u>	Saskatoon serviceberry	--	1/2
<u>Cercocarpus ledifolius</u>	Curlleaf mountain-mahogany	--	1
<u>Cowania mexicana</u> var. <u>stansburiana</u>	Stansbury cliffrose	--	1/2
<u>Prunus virginiana</u>	Common chokecherry	--	1/2
<u>Purshia tridentata</u>	Bitterbrush	--	2
<u>Rhus trilobata</u>	Oakbrush sumac	--	1/2
<u>Rosa woodsii</u>	Woods rose	--	1
			<u>6</u> lbs
Plus Rice Hulls			
TOTAL			<u>29-1/4</u> lbs

^{1/} PLS = pure live seed

WILDLIFE MIX

Company Log

Table 5.1-7 Seed Mix B, Proposed for Range Revegetation of the GMEA-1

Scientific Name	Species	Common Name	Variety	(lbs PLS/ac)
-----------------	---------	-------------	---------	--------------

GRASSES:

<u>Agropyron cristatum</u>		Fairway crested wheatgrass	Parkway	6.0
<u>Agropyron intermedium</u>		Intermediate wheatgrass	Arriba	
			Tegmar	6.0
<u>Agropyron trichophorum</u>		Pubescent wheatgrass	Greenar	
			Luna	5.0
<u>Agropyron riparian</u>		Streambank wheatgrass	Topar	
<u>Elymus cinereus</u>		Basin wildrye	Sodar	2.0
			-	2.0

FORBS:

<u>Onobrychis viciaefolia</u>	Sainfoin	Eski	12.0
<u>Sanguisorba minor</u>	Small burnet	Delar	2.0

SHRUBS:

<u>Purshia tridentata</u>	Bitterbrush	-	1.0
<u>Amelanchier alnifolia</u>	Saskatoon Serviceberry	-	0.5

Plus rice hulls

Date: Oct 21 1986
MINING PLAN APPROVED

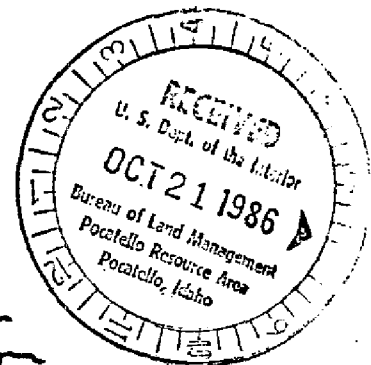
TOTAL
L. H. Johnson

36.5

Varieties listed are in order of preference.

Range Seed Mix

to be used on reclamation
areas, except where ident-
ified as wildlife Priority
Areas, see Sheet A-8



A-11

10-21-86

Status of Reclamation Compliance at Gay Mine

**Fort Hall Agency, Idaho
July 1997**

Prepared by:

David A. Koehler
Bureau of Land Management
Idaho State Office, Boise, ID

and

F.A. Sam Hernandez
Bureau of Indian Affairs
Ft. Hall Agency, ID

At the request of:

Jeff Steele, *Pocatello Resource Area Manager*
Bureau of Land Management
Pocatello, ID

and

J. David Brunner, *Deputy State Director*
Bureau of Land Management
Boise, ID

STATUS OF RECLAMATION COMPLIANCE AT GAY MINE, FORT HALL AGENCY, IDAHO, 1996-97

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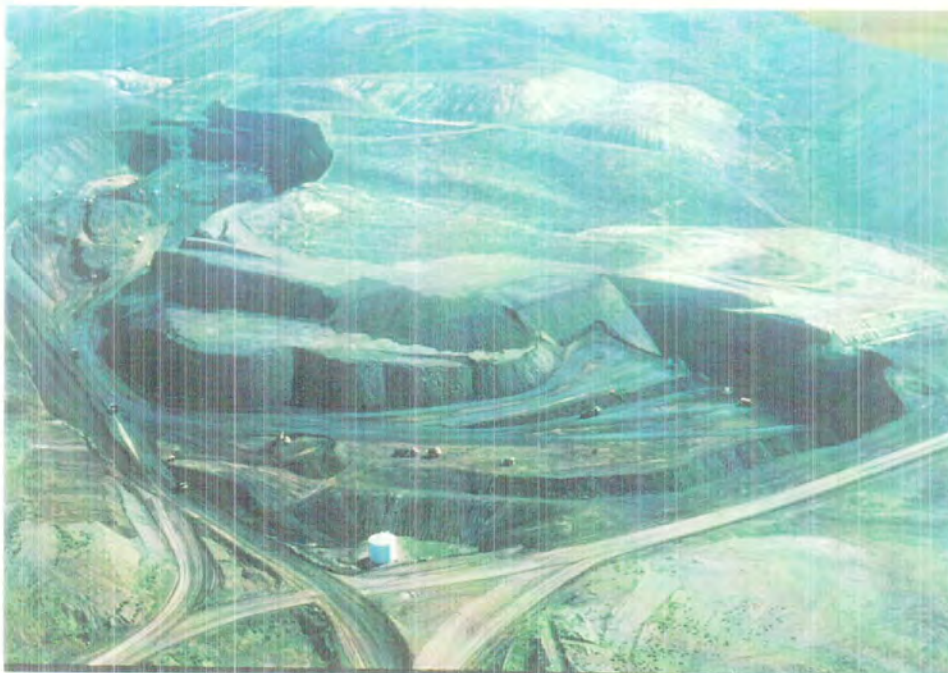
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July 1997



EXECUTIVE SUMMARY

In response to perceptual differences between interested parties regarding the desired final product of mining operations and subsequent reclamation on the Gay Mine, Ft. Hall Agency, ID, the trust agencies (Bureau of Indian Affairs and Bureau of Land Management, DOI) initiated a detailed inspection and evaluation of the surface disturbances associated with mining operations as they appeared in Fall, 1996. The inspectors examined operational sites three years after active mining had ceased. They also examined the available files to determine the level and intensity of contractual commitments made by the mining companies and/or required by the regulatory agencies. This latter effort required the review of existing lease agreements, mining plans, environmental assessments, reclamation plans, letters of authorization, conditions or stipulations of approval, and other relevant documents. In some cases, the intentions of the interested parties were not always entirely clear, and much of the language of the early agreements was non-specific and nebulous, at times even contradictory. Nevertheless, the inspectors/authors have endeavored to interpret existing documentation as literally as possible without amplifying contemporary expectations or requirements by a factor derived from modern regulation or technology.

The state of reclamation or remediation on the Gay Mine covers an entire spectrum of quality from excellent rangeland or habitat restoration to none at all, without apparent regard for the period of active operations. In general, most of the existing spoils dumps on the lease have been reclaimed to high standards and, with few exceptions, they are supporting diverse, stable, and functional plant communities. The problems associated with spoils dumps are usually minor and can be repaired with minimal cost or mechanical effort. A relative few have more serious problems requiring more intensive repair. Much greater deficiencies were found in mining pit sites, leaving an impression that the heavy equipment operating on them was abruptly shifted to other mining operations when the ore extraction stopped. Although there are also exceptional examples or exemplary mining reclamation of pits (e.g. JG Pit and II Pit), there are many others that received no post-mining treatment at all. Some of these will require relatively extensive efforts to reclaim to contemporary standards, including backfilling, high wall reduction, reshaping the surface, installing safety structures, and revegetation. The term "standard" as used in this manuscript implies measures of quality of mining/reclamation practices that were consistent with reasonable expectations within the industry at that particular point in time. Other pits contain

dumped materials nearby that will expedite reclamation and closure. Many of the primary and ancillary support facilities have not been removed or cleaned up and this needs to occur without delay or protest, since closure and abandonment cannot go forward until then. Other problematical issues and sites are addressed in detail in the main text of this report.

Since all of the invoked parties recognize that further delays are costly, it is hoped that the recommendations contained in this report will find concurrence from all of the interests. Consideration has been given to the high costs associated with reclamation technology and in some instances the authors have rejected resolutions that would have required excessive expenditures. In all cases, the suggestions in this manuscript relate most directly to the standards that prevailed at the time of active operations and the reasonable expectations that originated from them. The companies are encouraged to develop remediation alternatives or innovative compromises that all interested parties can agree to in order to achieve an acceptable final product. We are hopeful that the recommended actions can be implemented and the lease can proceed to final closure.



Figure 1. The headquarters(Campsite) area of the Gay Mine during active operations. In its peak years of productivity, over 2,000,000 tons of phosphate ore were mined annually.

TABLE OF CONTENTS

I. <u>Introduction</u>	11
II. <u>Historical Overview</u>	13
III. <u>Chronology of Regulatory Oversight</u>	13
IV. <u>Chronology of Reclamation Technology Evolution</u>	16
V. <u>The Mining Sequence</u>	21
VI. <u>Observed Compliance to Existing Standards</u>	23
A. <u>Headquarters and Tipple Area</u>	23
B. <u>North Limb</u>	30
C. <u>East Limb - Group 1</u>	35
D. <u>East Limb - Group II</u>	41
E. <u>South 40 Area</u>	44
VII. <u>Summary of Specific Conclusions/Recommendations</u>	49
A. <u>Headquarters and Tipple Area</u>	49
B. <u>North Limb</u>	52
C. <u>East Limb - Group 1</u>	55
D. <u>East Limb - Group II</u>	57
E. <u>South 40 Acres</u>	58
F. <u>Other Considerations</u>	60
CONSULTATIONS WITH OTHERS	61
Appendices	62

LIST OF FIGURES

	<i>Page</i>
Figure 1. Headquarters Area	4
Figure 2. JG Pit Reclaimed	18
Figure 3. A12 Pit	26
Figure 4. Abandoned Haul Road	29
Figure 5. Weed Infestations	29
Figure 6. K4 Pit	33
Figure 7. C9 Pit in North Limb	33
Figure 8. HH-GG Pit	38
Figure 9. Dumpfaces in HH-GG Pit	39
Figure 10. Dumpfaces in HH-GG Pit	39
Figure 11. Reclaimed Area in East Limb	43
Figure 12. JD Pit	47
Figure 13. JC Pit	47

LIST OF MAPS

<i>Plate 1</i>	9
<i>Plate 2</i>	25
<i>Plate 3</i>	31
<i>Plate 4</i>	36
<i>Plate 5</i>	46

APPENDICES

- A1 Phosphate Surface Mining Lease**
Dated February 4, 1946
- A2 43CFR, Part 196 - Phosphate Lease Use Permits**
- A3 Mining Lease**
Dated July 1, 1966
- A4 Mining Plan Approval**
Dated February 6, 1974
- A5 Partial Approval**
Dated February 25, 1976
- A6 Conditions of Approval**
Dated September 21, 1978
- A7 Approval to Partial Mining Plan**
Dated November 7, 1979
- A8 Approval to Partial Mining Plan**
Dated December 21, 1979
- A9 Approval to Partial Mining Plan**
Dated January 8, 1980
- A10 Approval Stipulations**
Dated June 19, 1896
- A11 Mining Plan Submission**
Dated August 5, 1986

A12 Approval to Modified Partial Mining Plan

Dated August 5, 1986

A13 Stipulations of Approval

Dated October 23, 1986

A14 Conditions of Approval to "Expansion Area" Mining Plan

Dated October 27, 1986

A15 Stipulations of Approval

Dated May 24, 1986

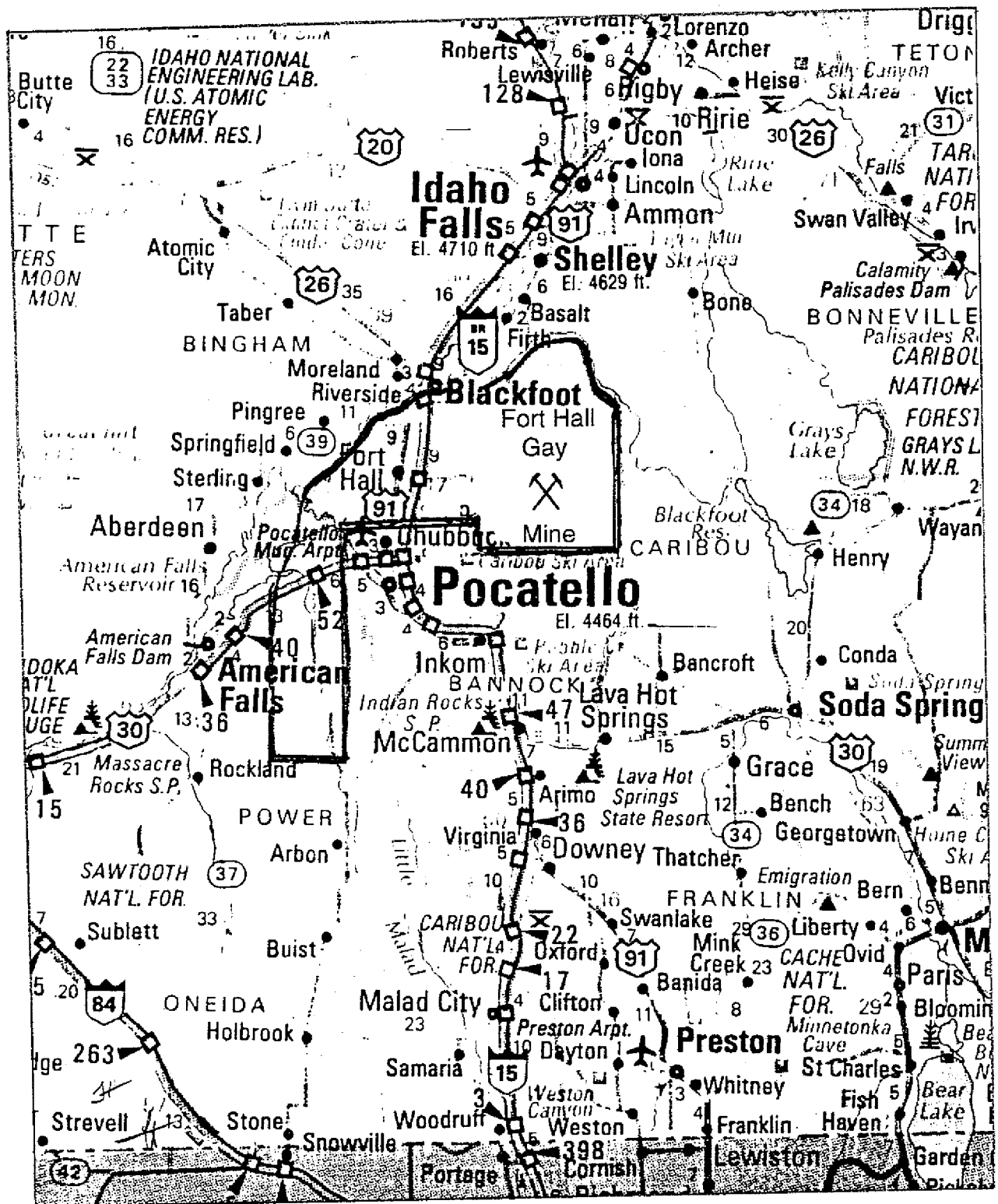


Plate 1. Map Showing the General Location of the Gay Mine, Fort Hall Indian Reservation, Idaho.

I. Introduction

In August, 1996, the authors were directed by their respective agencies (the Bureau of Land Management (BLM) and the Bureau of Indian Affairs (BIA), both within the Department of the Interior (DOI), to perform a review of the status of the various actions required to finalize closure of operations for the Gay Mine on the Fort Hall Indian Reservation, 25 miles NE of Pocatello, Idaho. The status of surface reclamation of mine pits, spoils dumps, mill shale storage piles, haul roads, former facility sites, and other disturbances, was determined by on-site inspections via vehicle, foot, and horseback. Each site was considered in terms of the period in which mining activities were actualized and the standards, specifications, obligations, and technology that prevailed at that point in time. Considerable variety in the quality of reclamation efforts was found within the same phases of operation in the mining sequence, suggesting that different supervisors and equipment operators demonstrated differential commitment to and/or familiarity with reclamation guidelines. In general, the overall quality of the reclamation program appeared to be good over the general landscape, with small to mid-size inclusions that were not completed or reclaimed adequately or satisfactorily. We were left with the general impression that in many sectors, the restoration process was terminated prematurely, before the last stages could be implemented.

The field inspection was undertaken by the Federal agencies as a trust responsibility to ensure that adequate measures had been taken by the lessees to avoid, minimize, or correct hazards and/or environmental damage. A Memorandum of Understanding signed in 1984 by BIA (Portland Area Office) and BLM (Alaska, Oregon, Washington, Idaho, and Montana State Offices) states that "Federal involvement will begin when a Federal decision is needed regarding surface disturbance, access, confirmation of mineral rights, or approval of permits, leases, and plans, under Titles 25 and 43 of the Code of Federal Regulations (CFR)". The MOU continues, that "the BLM has responsibility for supervision of mineral developments including leasing on Federal lands, and trust responsibility for approval and management of mineral exploration and mine plans on Indian minerals lands. The BIA has the lead Federal

trust responsibility for issuance and general administration of mineral permits, leases and bonds on Indian minerals lands".

During the course of the field review, several considerations were advanced so that determinations of reclamation adequacy could be made fairly and equitably. The process was grounded in the supposition stated earlier - that reclamation success or failure should be measured by the standards that were contemporary during active operations. As each site was visited and evaluated, the following qualifications were applied: (1) what specifications were required under federal regulations in effect during operations?, (2) what contractual obligations had been incurred by the mining companies in conjunction with lease terms and conditions?, (3) what standards were required by the current mining plan, environmental assessment, or reclamation plan?, (4) what standards were mandated by existing environmental legislation?, (5) what standards could be reasonably expected given the development and evolution of current technology?, and (6) what variances, modifications, and amendments were issued prior to the completion of programmed work?.

As agreed by the jurisdictional Federal agencies and the Shoshone-Bannock Tribes, an effort has been made in this evaluation to keep recommendations and findings within reasonable and equitable bounds. The mining companies, the J.R. Simplot Company and FMC Corporation, are not expected to perform extravagant or excessive work to accomplish suggested remediation. Recommended procedures attempt to avoid disagreement or controversy by offering practical solutions that are cost-effective and acceptable to all parties.

The conclusions reached herein represent the consensual perspective of the BLM, the BIA, and the Shoshone-Bannock Tribes, for remedial measures at the Gay Mine that will lead to comprehensive final closure, bond release, and release from continuing residual payments.

II. Historical Overview

The Simplot Fertilizer Company (now J. R. Simplot Co.) was established in 1945 to serve regional agricultural markets for phosphate fertilizers. As those markets expanded, the company pursued extractable resources on the Fort Hall Indian Reservation and in 1946 negotiated a lease with the Shoshone-Bannock Tribes, individual Indian land-owners, the BIA, and the U.S. Geological Survey (USGS) to perform open-pit mining for phosphate ore. The Gay Mine opened in 1946 and became one of the earliest open-pit and ultimately, the longest-operating phosphate mine in Idaho. In 1948, the Union Pacific Railroad constructed 21 miles of standard gauge railroad line between the Fort Hall Agency and the mine tipple.

The Gay Mine produced two basic grades of ore: the high grade (or acid grade rock) contained 30% or more phosphate and was used by Simplot for fertilizer production; the lower grade (or furnace grade shales) contained an average 24.5% phosphate and has been marketed after reduction to an elemental form to produce detergents, cosmetics, and a multiplicity of other products. The Westvaco Chlorine Products Company (later assimilated by Food and Machinery Corporation (FMC)) opened an electric furnace plant near Pocatello in 1949 to provide an instant market for the lower grade ore. The current Simplot fertilizer plant, which utilized 300,000 tons of ore annually at peak production (late 1970's), is adjacent to the FMC elemental phosphorous plant, which utilized 1,700,000 tons annually. The Gay Mine continued operation until 1993, at which time economically extractable ores had been essentially depleted.

III. Chronology of Regulatory Oversight.

After origination of the lease in 1946 by BIA, regulatory and administrative responsibility for the extraction of the subsurface mineral phosphate remained with USGS until 1983, at which time the reorganization of the parent agency created the Minerals Management Service (MMS). During the period 1982 - 1983, MMS

supervised all mining operations on open-pit Idaho phosphate mines until it was combined with the BLM in 1983. Since that time, BLM has assumed control over mining and exploration operations. During this entire period until the present, BIA has retained administrative control over permits, leases, and bonds.

It is important to note that there were two basic types of leases in effect at the Gay Mine. Mining leases affected the removal or physical extraction of overburden and phosphate ore from specified sites. Business leases were employed to authorize road and auxiliary facilities construction and the placement and storage of waste materials and mill shales. During the term of active mining, some leases were held jointly by FMC and Simplot; others were held separately.

The lease authorizing Simplot Fertilizer Company to commence phosphate extraction was formalized on February 4, 1946. The content of that lease addresses the subject of landscape restoration in an indirect manner by simply stating that the lessee will "return the premises upon the termination of the lease to whomever shall be lawfully entitled thereto, in as good condition as received--". Title 43 of the Code of Federal Regulations, Part 196 - Phosphate Leases and Use Permits, in effect at that time, enjoins the lessee that his proposed operations of the property will be in accordance with good conservation practice --"(Section 196.7(f)(4)). Title 25 CFR 171.24 provided that "when the lease is surrendered, the lessee shall deliver to the Government the leased ground with the mine workings in good order and condition, and bondsmen will be held for such delivery in good order and condition". Further, these regulations require that operating equipment may be removed by the lessee "only after the condition of the property has been ascertained by inspection by the Secretary of the Interior or his authorized agents, to be in satisfactory condition". 30 CFR 231.5 only required the following, "prior to the beginning of actual mining operations, maps and plans showing the proposed mining methods and the plant layout shall be submitted to the district mining supervisor for approval. Such maps and plans shall be modified as required by the district mining supervisor---". There were no specific requirements in the latter regulations for land reclamation subsequent to mining.

In a letter to his superior dated February 8, 1974, the USGS District Mining Engineer, John T. Skinner said that "a representative of the operating company explained recently, that to the best of his knowledge and according to company files, mine plan proposals were not required or submitted prior to 1970". Moreover, he continues, "during the same time period (1970 - 73) there were no environmental assessment reports, environmental impact statements, or reclamation plans received by the USGS as they related to 43 CFR 231, 25 CFR 177, and (the National Environmental Policy Act (NEPA). Possibly the lack of reclamation planning can be found in 25 CFR 177.2c which states "the regulations in this part shall apply only to permits and leases issued subsequent to the date on which these regulations become effective and which are subject to the approval of the Secretary of the Interior or his designated representative".

On February 22, 1973, the Secretary of the Interior signed an Executive Order which brought Indian Trust Lands under the protection and jurisdiction of NEPA 1969. NEPA provided a fundamental mandate that all Federal agencies protect and enhance the quality of the human environment and submit all proposed actions on Federal lands to a prescribed analytical process. Environmental Assessments (EAs) were required on all public land actions that would cause environmental impacts not previously analyzed. Environmental Impact Statements (EISs) were required for any Federal action significantly affecting the quality of the human environment.

Under the new NEPA authority, the BIA in 1973 requested that the mining companies prepare an Environmental Assessment. This first document was prepared by Simplot staff and submitted for agency review. After revision, the EA including mitigating measures was approved in 1974.

Since that time, the operating companies or their consultants have prepared and successfully submitted several major mine plans/reclamation plans. The "Group I" Plan was approved on September 21, 1978. The "Group II" Plan was approved on January 7, 1980. Finally, the "South 40" Plan was approved on October 27, 1986. Other authorizations or modifications were also approved: the KK-1/JJ-3/JA-1

Mine/Reclamation Plan on August 5, 1986, the A12 Mine/Reclamation Plan on May 24, 1989, and JD-2 Modification Plan on October 1, 1991. The JB Mine/Reclamation Plan was submitted in 1992 but never approved.

IV. Chronology of Reclamation Technology Evolution

In the first EA prepared and submitted by Simplot in 1974, the company articulated its reclamation strategy in detail. Each year, they would rehabilitate at least as much land as was disturbed in that year. Each area where operations were complete and no future mining was expected to take place would be sequentially revegetated. In the first step, old, mined-out pits would be filled as full as economically possible with overburden/spoils from other operations. In the second step, all dumps in the area would be graded to slopes that would not erode. Then, topsoil would be saved where practical and redistributed over disturbed sites. Finally, disturbed lands would be ripped and reseeded with crested wheatgrass (Agropyron cristatum). These measures, it was felt, would restore the disturbed lands to full use for grazing. Highwalls would be fenced or some other action satisfactory to landowners would be taken to eliminate hazards. After mining was completed, the company was confident that "the area will still be productive because of rehabilitation measures being practiced as areas are mined out. Grazing, which was the principle use of the land before mining began, will continue. A few years after operations cease, the ground should recover to its original carrying capacity and in some cases, exceed it".

During 1976 and 1977, the US Forest Service (USFS) and the Soil Conservation Service (SCS - now the Natural Resources Conservation Service (NRCS)) provided assistance by constructing test plots in order to facilitate selection of plant species and fertilizers best suited to reclaim southeastern Idaho mined lands. At the same time, SCS and USFS scientists were advising Simplot/FMC to adopt substantially more sophisticated reclamation methods. By 1977, the companies were employing more complex reclamation strategies, including the following components:

- Diverse seed mixtures including native grasses, forbs, and shrubs identified as dominant constituents of baseline vegetative communities.
- Greater emphasis on shrub establishment.
- Stripping and stockpiling topsoil before mining.
- Recontouring of backfilled mine pits and spoils dumps to approximate natural landscapes.
- Ripping compacted soils to one- to three- foot depths to facilitate water infiltration and aeration, plus plant root expansion.
- Redistribution of topsoil over rough or unsuitable surfaces.
- Discing/harrowing of soil surfaces after topsoil distribution.
- Fertilizer distribution on reclamation sites in amounts of 60- to 100-lbs N/acre, 60- to 75-lbs P/acre, and 100-lbs K/acre.
- Discing/harrowing a second time after fertilizer application to ensure vertical distribution.
- Late fall seeding with a rangeland drill, broadcaster, or packer/seeder.
- Fencing some reclaimed areas to exclude livestock until after seedling establishment.
- Application of seed mixtures at rates of approximately 39 lbs/acre (some prescribed species were not available at that time from regional seed distributors).



Figure 2. JG Pit Reclaimed One of the many examples of Gay Mine exemplary reclamation techniques. The pit has been backfilled to top of highwalls and regraded to create a closed basin effect. Topsoiling, ripping, tilling, seeding and fertilization have resulted in excellent diversified vegetative cover.

Reclamation technology continued to be refined and modified during the period 1977-1986. Many techniques were introduced after data became available from the experimental plots installed, monitored, and analyzed by Dr. Blane Z. Richardson, USFS, Intermountain Research Station. Additional equipment had been purchased by the operators. A cyclone seeder was being used to reseed sloped, rough, or rocky terrain. Maintenance fertilizer applications in the spring were administered to reclaimed sites. By 1986, the following procedures and policies had been incorporated into the Gay Mine reclamation strategy (Mariah Associates, Inc.):

- All amenable-to-reclamation areas would be backfilled and/or sloped to 3H:IV or less.
- Highwalls would be reduced wherever practicable.
- Topsoil would be salvaged and redistributed on reclamation sites to a depth of 8-10 inches. "Top soils" were constituted by soil material removed from the A, B and C horizons (generally 0 - 46 inches deep in the soil profile) which, after mixing and stockpiling, provided a suitable growth medium for plant growth.
- Prescriptions were formulated for restored wildlife habitat as well as rangeland. Objectives included a ratio of 40% wildlife habitat to 60% grazing land.
- Reclaimed soils would be ripped to a depth of 12 - 18 inches on the contour. When necessary, secondary tillage with a spring-tooth or disc harrow would occur.
- Separate seeding mixtures were applied for range sites vs. wildlife habitat sites.
- Seeding on range sites would be accomplished with a cyclone seeder; seeding on wildlife habitat sites would place alternate rows of grasses with forbs and shrubs with a Brillion seeder/packer.
- Compacted sites would be disced or harrowed to eliminate surface crusting.
- All access roads, haul roads, and facility sites would be ripped, fertilized, seeded, and reclaimed.
- Fertilizer would be spread with a cyclone seeder.
- Fencing would be installed to protect reclaimed sites with company materials and BIA labor.

- Noxious weed infestations were seen as a minor problem on revegetated areas that would be controlled with localized contact spraying with herbicides, however, no provisions were made for eradication.
- Monitoring would be implemented to evaluate revegetation success. Final evaluation would occur before relinquishment of obligations. "Revegetation success" was defined as adequate cover to protect soils, adequate forage production for livestock/wildlife, and acceptable species composition and diversity for forage, shelter, and ecological stability.

Generally, these principles and policies were followed for the duration of operations. This, however, does not imply that the reclamation process on Gay Mine is complete. From appearances, localized reclamation and land-shaping ceased when nearby fill sources were exhausted and the mine closed, leaving problematical sites in numerous locations. These will be discussed in a later section. All coordinated reclamation efforts stopped when the mining companies removed all heavy equipment in 1993, except for individual contracts with tribal members to perform ripping and seeding which continued until 1995.

V. The Mining Sequence

Historically, the economics of the phosphate industry have required a high volume, low unit cost approach to extraction and processing. In its peak years' of production, Gay Mine produced approximately 2,000,000 tons of ore per year. The phosphate mineral, cryptocrystalline carbonate-fluorapatite, occurred in strata that was generally steeply sloped and frequently interrupted by faults. Ore bodies frequently occurred in beds that were overturned or blocked by faults. The only economically feasible method for extracting this mineral was a surface mining operation that initially required the removal of substantial deposits of overburden. Such overburden materials consisted principally of chert, shales, and limestone deposits. Economically recoverable ore bodies occurred at shallow depths to beds covered by more than 300 feet of alluvium. Ultimate limits of the mining cuts depended on the amount and nature of the ore-bearing material and the economics of retrieval.

The most efficient method for phosphate mining at Gay Mine required a multiple-pit approach because of the discontinuous and scattered nature of minable ore bodies. This process facilitated backfilling of older pits so that land reclamation could proceed. As a first step, topsoil and alluvium were stripped and removed to stockpiles for future redistribution. Secondary overburden removal often required ripping or blasting with explosives prior to stripping. Heavy equipment deployed for stripping included hydraulic shovels (11 cubic yards), 35-ton end-dump trucks, twin engine scrapers, and front-end loaders. Much of the overburden was used to fill accessible previously mined pits; the remainder went to external spoils dumps. Selective ore removal required smaller (4-6 cu. yd.) shovels and trucks.

In the course of annual operations, all mining, hauling, and shipping of ore was accomplished in the May - October period. This was necessitated by the following reasons: (1) ores would freeze in the haul trucks and rail cars in the winter, and (2) heavy snowfall in winter resulted in very hazardous haul road conditions. Most overburden stripping was done in the winter. Because two basic grades of ore were

marketed, and the refining process was set up to handle two average grades with separate standards of impurities, separate stockpiles were necessary where ores were segregated and blended near the pits. These two types were subsequently hauled to the tipple and transported by railroad cars to the Simplot and FMC plants near Pocatello.

The mining procedure, which occurred in frost-free seasons, included excavating to recoverable depths in phases. Each phase was represented by 20-foot-wide benches placed every 60-feet in depth. Benched highwalls were normally found on only one side of the pit, but were occasionally needed on two or more faces, depending upon the incline of the ore stratum.

Backfilling occurred concurrently with active mining. Since backfilling was usually the most economic means of waste (overburden) disposal, it was utilized as often as possible as long as potentially valuable phosphate deposits lying deeper than the pit were not being covered. As long as this condition was met, or backfilling was practical on accessible sites, overburden was transported to previously mined pits. When transport of material to older mining pits was not deemed economical, overburden was placed in external dumps. Spoils dumps contained millions of tons of surplus material but were intended to appear, in their post-mining phase, as natural as possible with rolling or undulating contours and side slopes of 3:1 or less. The end product of this process was intended to be reclaimed areas that were "visually consistent with natural, undisturbed topography".

Another consideration in the process was the interim or semi-final disposition of mill shales or economically low grade ores. These are lower grade phosphatic shales that do not meet current requirements but may, in the future, as technology and economic markets improve, be processed or beneficiated into an economical product. Most of these have been mapped, shaped, sloped, and reseeded pending a final decision on their utility.

The final stage of surface disturbance involves the reclamation process. Policies and procedures for reclamation have been described in an earlier segment. The progression of reclamation activities, as listed in a 1986 EA, were as follows:

- Step 1. Where needed, placement of rock cores in the bases of waste dumps to provide drainage.
- Step 2. Backfilling of mine pits, shaping dumps to smooth contours, and final grading.
- Step 3. Topsoil replacement.
- Step 4. Primary tillage in the form of shallow ripping. Deep ripping of compacted areas such as haul roads.
- Step 5. Distribution of fertilizer and disking/harrowing.
- Step 6. Seeding.
- Step 7. Monitoring revegetation success.

VI. Observed Compliance to Existing Standards.

A. Headquarters and Tipple Area.

1. A general policing of the entire area has not occurred to affect the removal of trash and refuse, including but not limited to, material such as old tires, hoses, auto/machinery parts, cables, barrels and containers, broken tools, fencing material, samples, records, electrical parts, wood products, small sheds, and collapsed buildings.

2. The headquarters (campsite) area is a large complex of facilities associated with the mining operation. These will include the main tipple, chutes, loaders, conveyor belts and lines, various motors, engines, hydraulic pumps and lines, electrical systems, generators and assorted other equipment. Some of these items or materials will be retained by the Tribes but all else should be regarded by the mining companies as waste material.

3. The Union Pacific Railroad Company (UP) and the Surface Transportation Board (formerly the Interstate Commerce Commission (ICC)) still have not negotiated the disposition of 21.49 miles of railroad spur line presently lying between the main tipple and the Fort Hall Agency. The decision has been made to allow UP to abandon the line. However, consultations with the Tribes and compliance with the Historic Preservations Act must be completed.

4. The disposition of the airport or landing strip has not been finally determined. That decision remains with the Tribes.

5. All haul roads converge at the tipple; all those that will not be incorporated into the Agency transportation system have not been reclaimed. There are no water bars in evidence on any haul roads, regardless of slopes or grades. Three kinds of side cuts are seen along Gay Mine haul roads; vertical cuts, banked or terraced cuts, and 3:1 slopes, with consistent standards lacking in any of the primary sectors.

6. There are two damaged culverts on the haul road leading to the South 40 area southwest of A12 Pit.

7. The A12 Pit (west end) was abandoned leaving a standing highwall (approximately 80-100 feet high), with an empty cavity below. An aspen stand grows on the top (south side) of the highwall which will continue to slough. Fill material is available contiguous to the pit on the west side and the southeast corner. Additional fill material may be found on the slope to the northeast.



Figure 3 After reclamation, several problems remain or have been recently developed. On the north face of the lake (on left) several gullies have formed as a result of overflow coming off main haul road. The excavation on right needs to be stabilized by using material from both sides to regrade a shallow U-Shape that extends to half the height of the highwall. Highwalls with aspen stand can be allowed to slump naturally until angle of repose is achieved.

8. The A12 Lake lies at the bottom of an excavation approximately 225-240 feet deep. Three large gullies have formed on the north side as a result of continuous and unscheduled discharge of water from the upper storage ponds. This water drained abruptly, allowing lower catchment ponds to overload. As water was discharged from the ponds, the surplus was piped under the main haul road into a V-ditch and from there free-flowed into the old pit. The high volume and velocity of the discharge created deep cuts. These gullies have not been plugged, backfilled, regraded or reclaimed.

9. On the south side of the A12 Lake, there are perched seeps and springs on the rim that have attracted concentrations of livestock. Any future remediation will be constrained by saturated soils and the inaccessibility to heavy equipment. There are presently no fences or obstructions to livestock access. Because of saturated soils and instability, the site is not amenable to restructuring.

10. A gravel pit above A12 Lake remains open. The Tribes have not made a final decision regarding the closure or continued access to materials at this site.

11. The reclaimed spoils dump southwest of A12 Lake has vertical ripping in a V-shape converging through a notch in the northeast corner of the site. This dump has been seriously impacted by livestock grazing. The effect is compounded by erosion occurring as a result of vertical ripping.

12. The land farm north-east of headquarters was established to biologically degrade hydrocarbons contained in oil-, gasoline-, and hydraulic fluid-soaked soils. The site presumably contains residual petroleum products which must be processed before the area can be certified and closed. Before that occurs, saturated soils from the old trash dump above A12 to the west will be incorporated and processed. The dump also contains oil filters, tires, and auto parts that have not been removed and disposed of.

13. There are three storage ponds above A12 Lake. Even in their present, unimproved state, they are aesthetically pleasing and attractive and impound high-quality, spring-fed water. Flow is controlled by a headgate leading into two overflow ponds which discharge onto the north side above the A12 Lake.

Figure 4 Abandoned Haul Road

This and other haul roads have been vertically ripped resulting in water channeling and erosion. Sloped linear surfaces will require water bars, followed by harrowing and reseeding.

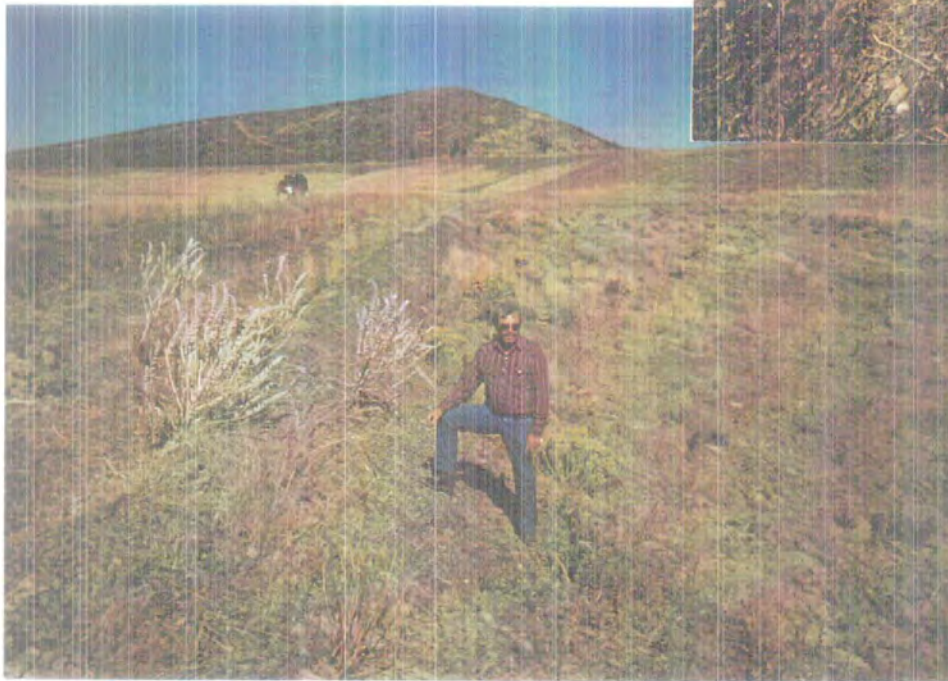


Figure 5 Weed Infestations Haul roads are the primary establishment corridors for noxious, invasive plant species. To the left is black henbane; to the right is musk thistle and Russian knapweed.

B. North Limb.

1. Active operations of the C9 Pit were concluded in 1978-79. On the south end of the pit, the excavation has been completely regraded and reclaimed. The backfill has been sloped at a gentle grade down to the east highwall and supports a vigorous community of grasses and forbs. On the north end of the pit, however, there is a large linear trench between the highwall and the terminus of the backfill. Spoils dumps to the east and north of C9 Pit have been reclaimed to more than acceptable standards and present a good example of reclamation success.

2. The Powder Shack remains locked and secured, suggesting that there are remaining explosives in that facility. Representatives from the Tribes have confirmed that the facility has been made available to the Fort Hall Police Department.

3. North of C9 Pit, the haul road proceeds between steep vertical walls on a wide Right-of-Way. The Tribes and the Companies desire that this and other key haul roads remain in a physically and structurally intact condition so that mill shale reserves which have been stored on-site can be accessed in the future.

4. North of the cut referred to above, is the old G Pit on the right side of the road. From appearances, this pit was probably mined and backfilled under pre-NEPA regulations. The pit has been backfilled but doesn't appear to have ever been regraded. There are still pronounced piles, now covered with volunteer vegetative growth, instead of a graded slope. It looks as though transport trucks backed in, dumped spoils, and departed. The old highwalls have degraded and decomposed parent material has overlapped the backfill. Secondary succession is occurring on this raw material.

5. To the left of the road, there is another old pit that has been utilized to deposit what we were told by a company representative was loose mill shale, but we later learned was overburden. The material deposit is much more recent than the inactive pit. The materials were dumped over the edge of the pit to form a steep side slope. There was no subsequent action taken on these raw materials.

6. The K4 Pit is a large, deep, excavated crater with a rough, corrugated bottom and sides. The 1976 Mining Plan specified leaving a 12.05-acre pit but it appears to be larger. An attractive pink rock is exposed on the north and west sides, which gives the depression a unique appearance. On the north side, an installed water trough is running over and then pooling before discharging into the pit. The trough was probably installed by the BIA Land Operations Branch. However, a V-ditch constructed to dispose of the water is a problem since the water is continually cutting through soil materials. Cattle trailing to the water are also creating linear paths that will eventually become entrenched erosion channels. The broken water line and drinker have not been addressed by any of the interested parties since the cessation of operations. No backfilling is planned or required for the main pit.

7. The M6/M7 Pit was backfilled and reclaimed in a north-to-south direction but reclamation stopped just short of completion. There is a breach between the highwall and the backfilled material.

8. A V-ditch was constructed to drain water from M6/M7 Pit into O Pit along an old road. The ditch is parallel to that road but has blown out a 90-degree turn in the ditch/road. That breach is not repaired and is deepening.

9. There are two piles of black shale in Pit O that can be seen near the bottom against the west end. The shale piles are not large and contribute to a basically unfinished appearance.

Figure 6 K4 Pit

This mine operation in North Limb left a deep excavation over 12 acres in area. Since the mine plan was pre-NEPA and the stipulations of approval (1976) did not require backfill and reclamation, no remediation was done.



Figure 7 C9 Pit in North Limb

Located just to the right of the haul road, this pit was partially reclaimed. In the foreground, spoils were sloped to the highwall and seeded. In the background, there is an empty cavity between the highwall and spoils dump that was not backfilled or reclaimed.

10. The test plot near O Pit has a broken fence and no further utility.

11. Mill shale pile No. 4 north of the road on Lincoln Creek is breached and eroded in the northeast corner. This location lacks plugging, reinforcement, and general repair.

12. QQ Pit (the north end) was adequately backfilled and reclaimed and provides an excellent example of good reclamation practices.

13. All north end spoils dumps were found to be in fine shape. These provide still other examples of commendable reclamation practice.

14. The QQ Pit (the south end) is an older pit containing ragged piles of black shale. There is a dense chokecherry stand on the north wall that occurs in conjunction with a wide seep on the highwall face. The east end is characterized by a monocultural stand of yellow sweetclover and rills and gullies are developing as a result of low plant cover. Large, uneven piles of waste material were left intact instead of being regraded. There is also a large pile of waste shales on the top of the south wall. There is an abundance of material that could have been efficiently utilized as fill material or growth medium for reclamation but was not. The present configuration does not demonstrate any attempt to return the land to a usable status. The pit bottom is bare in many places and weed-infested in others. Cattle trails are entrenched and forming gullies. There is also a small wash developing on the west end.

C. East Limb - Group 1.

1. The haul road in this sector is very rough with patches of bare soil and heavy erosion occurring regularly. In general, revegetation of the road has not been satisfactorily accomplished. Invasive, noxious weeds are much in evidence here, especially black henbane and various thistles.

2. A haul road winds down into W Pit, which contains a shallow pond that supports a substantial community of cattails. A large patch of Canadian thistle has established on the north highwall and seems to be expanding. The south side of the pit was left in a particularly rough and irregular state. Oddly, aspen trees are reestablishing on these waste piles, some of which are ten to twenty years old. The northeast corner of the pit has a sizable gully in a vertical cut. The haul road within the pit has slumped off in many places causing more asymmetrical terrain. Rock piles, old berms, bumps and piles, and old highwalls contribute to a very jagged-appearing topography. There is a livestock water source here but it is filling rapidly with sediment and can not be considered a permanent water. This site has received relatively high human visitation and there are safety concerns relating to the standing water, the road conditions, and the sloughing highwalls.

3. The north side of the reclaimed spoils dump associated with W Pit has developed two pronounced gullies. One originates from the spoils edge; the other originates from the V-ditch.

4. Mill shale pile #31 is bare and unreclaimed. Part of this storage pile has been re-excavated and was shipped as furnace grade ore (phosphate content of these materials is approximately 22 - 23 %). The eastern edge of this storage pile in its present form will not support or accommodate substantial vegetation.

5. JJ Pit was completed in 1992. Overburden from the pit was skimmed and pushed into a notch above the Baker Canyon Road. There are also rough piles to the north of this that have not been regraded. Seeding did not establish well because it was not regraded and dressed.

6. HH Pit stands out as an anomaly on the Gay Mine. It was an open pit mined in the 1980's which was then utilized as a waste dump in the 1990's. Absolutely no reclamation has been done here within the main pit area. It remains an open pit with highwalls or steep dump slopes on all sides. The east and north sides evidently served as a spoils dump which extends to the top of the highwall. This material has been graded toward the center of the pit and reseeded but ends abruptly in a high bare angle of repose. It looks as if the company intended to backfill this pit and started to do so but suddenly abandoned the effort. Trash and old tires are mixed with the spoils and are exposed on the east side. The material in this waste dump could have been redistributed at a lower height to create an adequate reclamation effect at the bottom of the pit, but was not. The reclamation effort at this location epitomizes poor planning, poor utilization of material, and generally poor remediation. The present pit bottom can be accessed by a narrow cow trail. The livestock pond above the pit to the west is enclosed by a ragged, uneven berm and is vulnerable to breaching on the northeast end.

7. North of HH Pit, there is a haul road that will be left intact to provide future access to mill shale storage piles. In the middle of the haul road to west of B Pit is a large sinkhole that is a hazard to traffic.

8. BB-3 Pit is also essentially unfinished. However, fill is readily available on the east, west, and north sides, and perhaps from the extensive road embankment on the northeast side. There is a spring on the north side of the pit that should not be covered and could be developed for livestock water.

9. II-3 Pit has been completely reclaimed and probably epitomizes an ideal reclamation scenario. Backfill here has been fashioned into a shallow closed basin with an ephemeral lake in the bottom. Perennial forage grasses and forbs have been successfully established on the surface. There is, however, a small gully on the north end. There are a number of dead tree trunks here that remain from an earlier unsuccessful effort to transplant live trees from undisturbed areas.



Figure 8 HH-GG Pit

The composite photo shows a post-NEPA pit that has not been efficiently remediated. Overburden was dumped over east and north highwalls (left) instead of being efficiently redistributed.



Figure 8 HH-GG Pit

The composite photo shows a post-NEPA pit that has not been efficiently remediated. Overburden was dumped over east and north highwalls (left) instead of being efficiently redistributed.



Figures 9 and 10 Close-ups of dump faces in HH-GG Pit.

Within this pit, only the spoils dump has been revegetated. The pit was used for waste disposition but the spoils material was not put to good use.

10. The NN, AF, U, and OO Pits, also referred to as "Alf" Pit, were a series of pits mined during the last 4-5 years of the mining operation and were mined simultaneously with the South 40 area. This is a deep, extensive, unfinished pit that has only been reclaimed on the east side. From there, the backfill undulates down to steep berms and an open pit on the bottom. Gullies have started to form on the east (reclaimed) side and on the spoils pile to the south. There is no reclamation whatsoever on the south or west sides. This location also contains the worst infestation of noxious weeds on the entire mine. There is a large patch of musk thistle on the rim with scattered plants below. Black henbane is well established in the pit and along the haul roads.

D. East Limb - Group II.

1. Z Pit is a deep, circular indentation with an emerald green lake on the bottom, last mined in the 1980's. A steep cow trail descends to the bottom from the southeast corner. The lake is a good stock water but sedimentation is occurring rapidly. A shallow shelf extends 30 - 50 feet out into the water where soil materials have washed in and threaten to fill the lake and displace the water. The west side has spoils dumps over the side of the pit highwall which has resulted in a loose, bare angle of repose. On the south side of the pit, there is an aspen stand on the top of the highwall. Seeps and springs emerge from midway of the highwall. A crack or cleft about 3 - 5 feet wide has formed through the aspen stand about 20 feet from the edge. The crack is presently held together by the aspen root system but separation is imminent. The short-term future of the lake as a livestock water source is jeopardized by the rapid degradation and collapse of the steep highwalls and is unlikely to be sustained. Some previous arrangement to leave the pit as is may have been made to accommodate livestock owners/permittees. However, the present status does not meet standards for mitigation or reclamation specified in EA's, mining plans, or reclamation plans that were operational at the time of active mining.

2. Spoils dumps located between Z Pit and Y Pit were reclaimed to very high standards. Seedings are well established and support a diverse population of desirable species. Contours and grades closely resemble the natural landscape. These pits were among those adjacent to the public road in Bakers Canyon which were assigned the highest priority for backfill, shaping, and reclamation, in order to resemble pre-mining conditions.

3. T2 Pit is a dry pit approximately 300 feet deep. Standing on the bottom, we could hear aggregated material falling from the south highwall, suggesting that this sloughing occurs constantly. The south highwall is composed of highly fractured, loosely aggregated material at an angle of repose. The east side of the pit is well-reclaimed and slopes to the west but then ends. The west side of the pit is rough and bumpy with old piles of waste material scattered around that have not been

redistributed or reworked as would have been expected. The north side of the pit has been ripped vertically up and down the slope so that vegetation is not well established there and sheet and rill erosion is occurring. The northwest corner is very rough and contains waste piles and material that is unreclaimed. This is an area where reconfiguration and revegetation could have been accomplished with very minimal work. There is no vegetation (either natural or established) on the north end of the upper pit.

4. S Pit displays an excellent job of total reclamation. The work is nicely feathered into native vegetation to make a very subtle transition. Vegetative cover is almost 100 percent. On some portions of the haul road, however, certain sharp edges on road cuts and embankments remain at steep angles. There is also a buried culvert on this road that is not functional. Reclaimed area to the west of pit also looks very good.

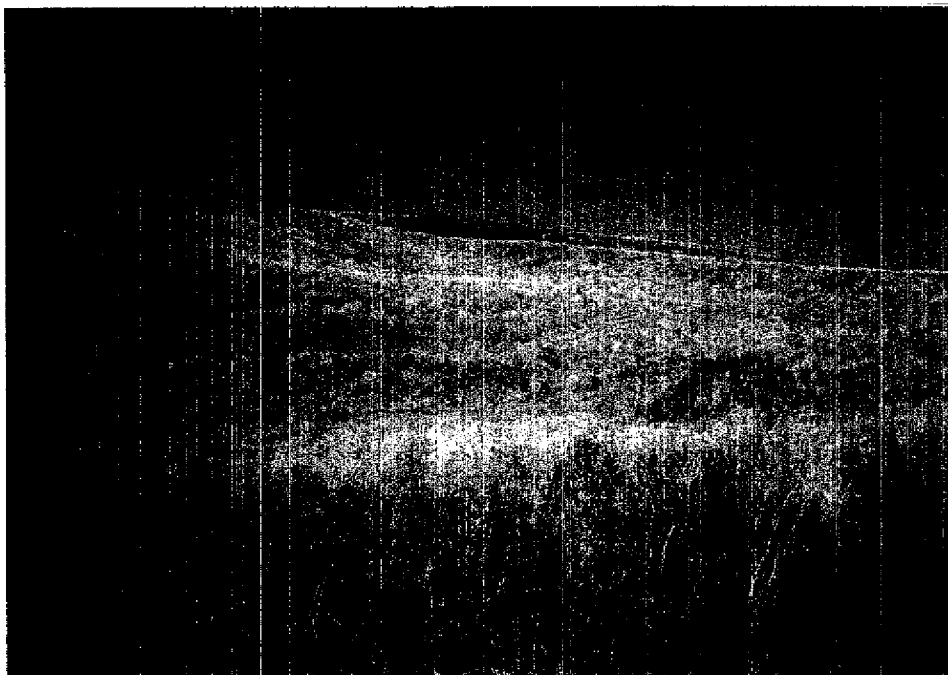


Figure 11 Reclaimed Area in East Limb

Another example of excellent reclamation. This spoils dump south of the haul road had been carefully recontoured and revegetated to resemble natural terrain.

E. South 40 Area.

1. The JG Pit was the first excavation at this location and extended to an ultimate depth of 310 feet. It has been nicely reclaimed by backfilling and reshaping into a closed basin design which is covered by a dense community of reestablished forage grasses, forbs, and sub-shrubs. The mining companies evidently employed state-of-the-art technology to remediate surface disturbance and achieve a highly desirable result at this site. Backfill was transported to JG Pit over a considerable distance from the more recent JC, JF, and JD Pits. The only, minor problem at this location is a deep cut (gully) that has developed at the southeast corner of JG Pit, where overland flow of water coming off the JG spoils dump has funneled down and caused erosion.

2. The disposition of overburden materials from JG Pit was placement in the JG Dump which was situated to the south and east of the active mining operation. This dump has also been reclaimed in an exemplary fashion. Several small erosion channels, however, have developed on the west face of the dump.

3. There are small sinkholes in the haul road near JG Pit but the road is not active and will probably not be reactivated.

4. In the final phase of mining operations on the Gay Mine, the JC/JF-1/JF-2/JD Pits were excavated to create a deep north-to-south trench with steep highwalls on the east and west sides at a depth of 250 feet and more. This area has been and continues to be the most controversial operation on the mine. In the early stages, overburden removed from JC Pit was transported to the northeast and deposited in the JC Dump. The partial result of that action created a visual screen that intersected the vision of casual observers on the main haul road and obscured the visual impact of excavation at the base of the mountain. Other overburden taken from JC Pit, then JF-1 and JF-2 Pits, and finally JD Pits were utilized to backfill JG Pit. The last pit mined, JD Pit, also partially provided backfill to reconstruct the bottoms of JC Pit and JF-1 Pit and the final result produced reclaimed bottoms at the north and south

extremities of the main trench with tall berms separating the former from the larger cut in the center. A series of stress fractures has developed above JC Pit on the west side which contribute slumped materials into the trench. The mining plan had indicated that this section consisted of stable and impermeable rock. There are three mill shale storage piles between the trench and the road that partially screen the excavation from public view.

Controversy attending this excavation has been strident and vigorous. Major differences regarding the end product and the final appearance after treatment have generated disagreement among the interested parties. The first of these differences simply reflect that the Tribes did not anticipate the magnitude of visual impact that was occasioned by the final excavation. A series of modifications to the original mining plan and a sequence of changing scenarios may have confused many Tribal officials regarding the final product. The final mining plan for this sector, though properly approved, is arguably inconsistent with earlier authorizations including the original lease agreement. Finally, the mining/reclamation plans suggested that there would be only one unreclaimed pit, whereas the current status has left a continuous series of unreclaimed deep pits that have received minimal remediation.

5. The Mining Lease of Indian Lands (1967) states that "upon termination of operations ---the lessee shall---leave all of the areas on which the lessee has worked in a condition that will not be hazardous to life or limb---". There are pockets and sectors of the top of the west highwall that demonstrate extreme instability. These are seen on aerial photographs as concentric cracks proceeding from the highwall edge. Such areas constitute a safety hazard to humans considering the instability of the slopes of both highwalls.

6. The double culverts under the roadway crossing Willow Creek are partially blocked, collapsed, or filled by sedimentation. Piping is occurring from the roadway fill and is allowing sediment transport into Willow Creek.

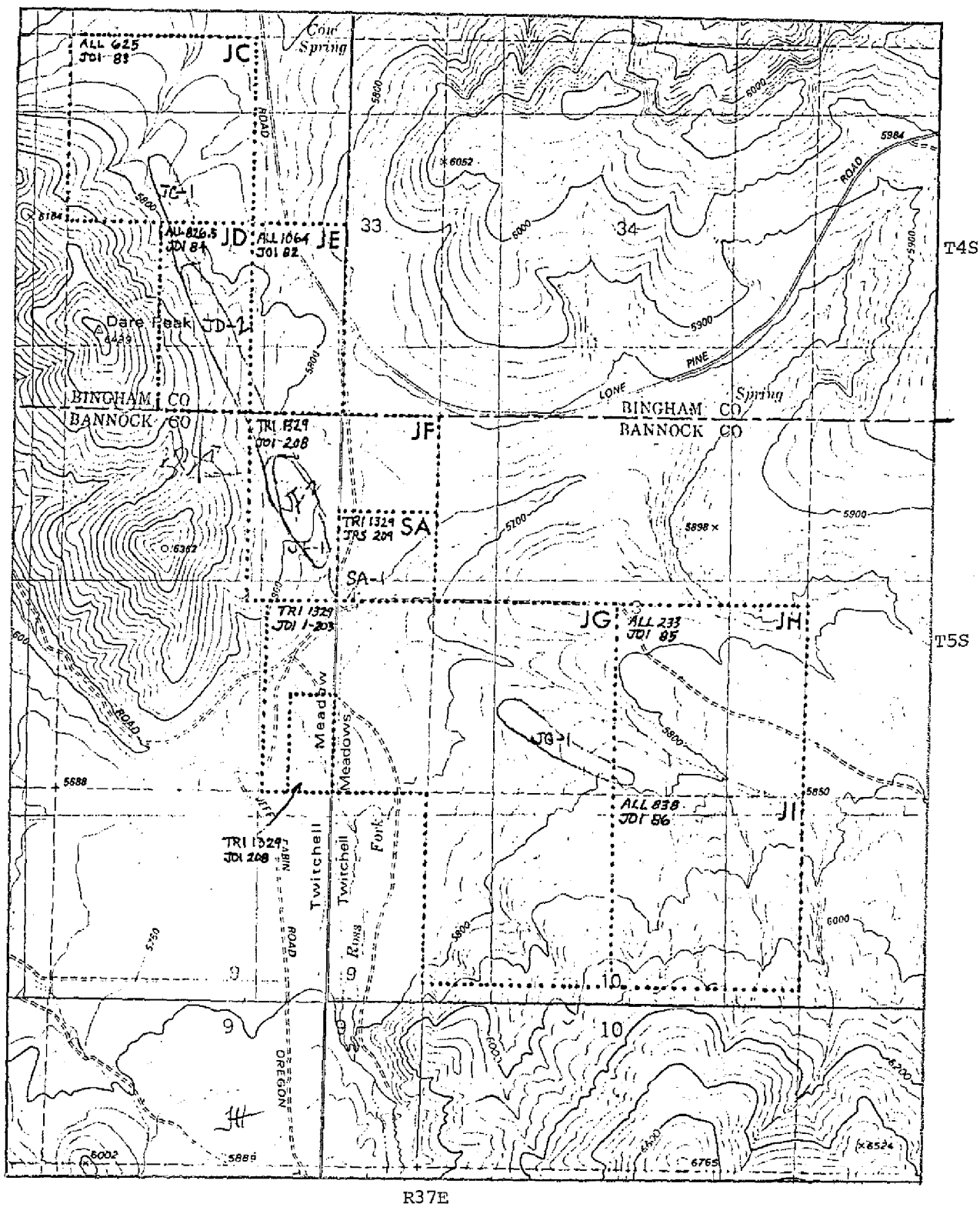


Plate 5. Location Map Showing the South 40 Area, J.R. Simplot Gay Mine

Figure 12 JD Pit

This series of pits in the South 40 area is very deep and very steep. The west highwall (in sunlight) is a 70-degree slope and would be difficult to reduce because of the mountain behind it.



Figure 13 JC Pit

This site has been partially backfilled with spoils from JD Pit. It is separated from JD Pit (which is not backfilled) by the steep berm in the lower left corner of photo.

7. The South 40 area has scattered infestations of yellowstar thistle, knapweeds, black henbane and various thistles. At this point in time, the plants have not consolidated into monocultural stands and could be readily controlled. Any delays will invite expansion of local populations and costlier controls at a later time.

VII. Summary of Specific Conclusions/Recommendations.

A. Headquarters and Tipple Area

1. A comprehensive cleanup of the administrative area and other sites needs to be finalized. All material not identified by the Tribes for retention needs to be picked up and removed from the lease site. This effort must include all waste, surplus, and extraneous material not specified as having future utility to the leaseholder (Shoshone-Bannock Tribes).

2. All surface disturbance associated with transport and processing of ore materials and the administration of the primary facility require rehabilitation and reclamation in the same manner and to the same standards as closed field operations. Haul roads, the airstrip, building sites, parking areas, storage and staging sites, and other locations which involved surface disturbance should be reclaimed. These surfaces should be ripped, scarified, and reseeded. Water bars will be required where significant erosion of reclaimed roads by runoff has been observed. Water bars, where needed, will be placed according to the following standards: a) on 1-5 degree slopes, a 3-foot structure will be placed at right angles to the road at 200-foot intervals, b) on 5-10 degree slopes, a 3-foot structure will be placed at 100-foot intervals, and c) on over-10 degree slopes, a 3-foot structure will be placed at 50-foot intervals. On roads that will remain open for administrative or other purposes, the structure may be flattened to accommodate traffic. Closed roads will be barricaded as well as barred. Where practical, side cuts will be reduced to 3:1 slopes and reseeded.

3. Repair or replace the two damaged culverts, near A12 Pit proceeding southwest on the old haul road, with new culverts or stabilized, rock-faced spillways at least 30-feet wide. The latter structures should be wide enough to adequately discharge water.

4. Using spoils materials from close by, reshape the A12 Pit so that the cavity at the base of the highwall is closed and a shallow U-shaped depression is formed that extends to a line halfway up the present highwall. Reclaim this reshaped area to current standards and allow the aspen community at the top of the highwall to slough naturally. The Companies have recognized the potential safety hazards associated with this pit and are committed to install fencing along the south/east highwalls.

5. Close and reclaim gravel pit on the south side of the A12 Lake after determination by the Tribes that source material is no longer needed.

6. Enclose the wetlands on the south rim of A12 Lake which contains natural seeps and springs so that it may recover naturally in the absence of livestock grazing. This will allow the vegetation to reestablish naturally and stabilize underlying soils to the extent possible. This would be a good location to plant willow slips and cuttings. The site is too wet and unstable to permit physical restructuring.

7. Management and effective operation of the water ponds above A12 Lake will require an active partnership between the Tribes, landowners, the Companies, and cooperating agencies. A comprehensive and coordinated strategy with the Tribes is essential to stabilize the site. The local office of the Natural Resources Conservation Service (NRCS) can be consulted to provide design and structural assistance and criteria. Without proper and sustained management, the surface linking the ponds and lake will continue to experience accelerated erosion. It is imperative that a responsible party (until relinquishment occurs, that will be the Companies; after relinquishment, that will be the BIA Range Department) will assume management responsibility for water levels and releases. After the Partnership determines the final design and management alternative, the Companies will be required to shape and top dress the disturbed surface of the site on a one-time basis only. The Companies will not be responsible for subsequent repairs.

8. Revisit all spoils dumps where vertical ripping and subsequent erosion have occurred and rip these sites in a direction that is horizontal to those slopes, followed by ripping and reseeding.

9. Introduce any remaining soil material saturated with petroleum products to the land farm located near the headquarters area. When present and introduced materials have degraded to the point that processed soils can meet testing and certification standards, the site should be closed using current reclamation procedures.

B. North Limb.

1. Revisit C9 Pit and regrade spoils piles at north end to a gentle, rolling slope that terminates at the base of the highwall in a shallow U-shaped depression. There appears to be sufficient material in the spoils pile and berm to regrade an uninterrupted slope to the bottom of the highwall. Regraded slopes will need to be reseeded and restored to productive rangeland. Fencing above the highwalls or constructing a berm needs to be completed for public safety reasons.

2. Remove any remaining explosives from the powder shack and then demolish the storage facility, followed by site reclamation. At present, the powder shack is being utilized by Tribal Police for storage of explosives and/or ammunition. If the Tribes desire to retain this facility, a Tribal Resolution granting a waiver should be addressed to the Companies at the earliest convenience. In the absence of notification, the Companies will not conduct any work in this area and all parties will regard this inaction as a decision to retain the facility.

3. The Tribes and Companies desire that this and other key haul roads remain in a physically and structurally intact condition so that mill shale reserves which have been stored on-site can be accessed in the future. These roads have already been ripped and seeded and in most stretches vegetation has successfully established. There are specific sites, however, that will require additional reseeded. A single-lane road shall remain for administrative purposes. The Tribes desire that these roads will not be part of a public access system.

4. There is an older, pre-NEPA pit north of C9 Pit referred to as G Pit where spoils materials were dumped but not regraded. Technically, the Companies can not be required to revisit this site, however, a small amount of work here would greatly enhance the appearance of the site and make it look more natural and consistent with surrounding topography. That material could be graded in a gentle slope to the old highwall and reseeded, which would fulfill terms of the original lease and provide greater integrity to the overall reclamation effort.

5. Farther north, there is another older pit (west of the old I Pit) that has been used for dumping what we were told were mill shales but subsequently learned was overburden. This material needs to be redistributed, regraded, and reclaimed.

6. K4 Pit was designated and approved in the operations plan as an area that would be left as an open pit. This was a decision that would not be acceptable today under more stringent reclamation requirements. It is difficult for the reviewers to imagine that the current status of this site conforms to the fundamental intent of the 1946 Lease which promises to restore the land to "as good condition as received". However, the correspondence and documentation from that period clearly indicate that no requirement for remediation or backfill was articulated previous to the operational phase even though the federal regulations applicable at the time required "good conservation practice" (43 CFR) and surrender of the leased ground "in good order and condition" (25 CFR). In spite of concerns about its unsatisfactory appearance and safety issues, the pit will probably remain in an unaltered state. On the perimeter of the pit, several items are problematical and require repair:

- move the pipeline and water trough to the restructured swale to the northwest and away from the pit rim where water spillage and livestock trampling are causing aggravated collapse and erosion. This development was probably installed by the BIA Land Operations Branch, which should also be responsible for fixing the problem.
- a berm or fence on the perimeter of the pit will keep livestock off this sensitive and hazardous area.
- eliminate the V-ditch that is channeling water over the edge of the pit and creating a major head cut. One possible alternative would be to place water spreaders in the drainage to the northwest to dissipate water flow.

7. Complete the backfill and reshaping of loose material at the south end of M6/M7 Pit, which is unfinished. This is another of those areas where work seems to have stopped prematurely. A minor investment of time and machine hours would allow this site to be reclaimed in a manner more consistent with the Companies' reputation for good reclamation. Only the south end of the pit requires follow-up topdressing.

8. Repair and reinforce the breach in the V-ditch which channels water from M6/M7 Pit to O Pit.

9. Redress the upper end of O Pit and consolidate the spoils piles there into the final landscape appearance. Two piles of black shales were left at the west end that should be reshaped and redistributed. A minimal effort is required to complete this task.

10. The test plot here has a broken fence and has no further utility. Remove and salvage the fencing material from the test plot.

11. Plug, refill, and repair the erosion channel that has formed on the northeast corner of the mill shales storage pile north of Lincoln Creek. Repairs have been previously made but have not persisted. Another strategy can be considered.

12. The south end of the QQ Pit contains numerous waste piles and spoils dumps that have not been effectively utilized for restoring the land to a functional status, as agreed. A substantial effort is required here to redistribute the abundant waste materials and reclaim the site to productive rangeland. Some indigenous vegetation has established here but adequate diversity, cover, and production are not attainable without surface manipulation/reseeding.

C. East Limb - Group 1

1. Control weed infestations along haul roads and rip and seed those areas on it that have not successfully been revegetated.

2. W-2 Pit is another location where significant reclamation did not occur. This area was mined pre-NEPA but did not conform to original lease stipulations which committed to restoring the land "in as good a condition as received". Stock water will not be permanently available here so that the shallow lake can be filled in without perpetual impact to the site. The site requires full restoration beginning with backfilling and highwall reduction and ending with a fully revegetated basin sloped to the middle with only one or two standing highwalls. Some care may be taken to avoid and preserve established aspen trees on the south side. There are safety concerns about this pit which need to be addressed because many schoolchildren and classes take field trips to this site. Travel on the access road is also dangerous and is a potential hazard. A large patch of Canadian thistle has established on the north highwall and is proliferating; this infestation needs to be controlled or eradicated.

3. Repair and fill two gullies formed on W Dump or JJ/JA backfill, one on the spoils edge and the other from the V-ditch.

4. The eastern side of Mill Shale Pile #31 needs reshaping and reclamation since furnace grade ores have been retrieved and shipped from this site.

5. Complete shaping and reclaiming the notch between the Baker Canyon Road and JJ Pit and redress the area behind (to the north of) the notch.

6. HH Pit served as a depository for overburden materials but otherwise received no reclamation except on the top of the backfill pile. The reviewers fully recognize and understand the concept that the last pit in a mining series could not always be backfilled. We do not agree that this circumstance constituted licence or permission by the federal agencies to the Companies to completely absolve them of any reclamation responsibility. Moreover, we feel that it is somewhat presumptuous of the Companies to argue that their obligation is completed. Reconfiguration and

reshaping of a mined site can occur even in the absence of backfill materials. This is another site that will require a comprehensive restoration strategy and implementation and a full spectrum of treatment from highwall reduction to reshaping to vegetation establishment. Reclamation at this site to reasonable standards will commit significant manpower and machinery to that process. The berm above the stock pond to the west of HH Pit needs to be leveled and reinforced at a consistent elevation.

7. Repair large sinkhole in roadway as agreed in memo dated April 28, 1997.

8. BB-3 Pit needs extensive reclamation also. Fill material obtained from the north, west, and east sides, and from the wide roadway, should be pushed and graded toward the northeast highwall and reseeded. Avoid working in and around the spring on the north side. This is another site where the Companies did not do all the things they could have done to optimize the final reclamation product.

9. Repair small gully on the north end of II-3 Pit or line the primary channel with rock to prevent headcutting.

10. The NN, AF, U, and OO Pits have only received reclamation treatments on the east end. No reclamation has occurred on the north, west, or south sides. Complete restoration will necessitate the importation of fill material, highwall reduction in some sectors, surface reconstruction, and vegetation replacement. There are many things that can be done to improve the appearance and productivity of this area. Extensive time and effort are necessary for this location to meet obligated standards. Tribal contracts and other perquisites notwithstanding, the Companies still retain primary responsibility for state-of-the-art reclamation. Fences and/or berms need to be completed above highwalls.

D. East Limb - Group II

1. Z Pit was abandoned without highwall reduction or mechanical manipulation of the substantial amounts of spoils that were dumped inside. Reclamation here will require a major commitment of time and machinery. A design for rehabilitation should be comprehensive and should encompass all major components of pit restoration, including highwall reduction on two or more sides, backfill from all available sources, reconstruction of the water storage pond to assure more permanent availability, reshaping slopes and approaches to the water to acceptable grades, and the reestablishment of permanent, perennial vegetation.

There is disagreement regarding the Tribal request to leave this pit unreclaimed. The available livestock water is not a good trade-off for leaving this large pit completely unreconstructed. Moreover, the federal agencies never relinquished authority for these kinds of decisions to the Tribe or any committee of the Tribal government. Any informal agreement with the Mining Committee or other entity is invalid and the Agencies will require that this site be restored to contemporary standards as mutually agreed by the interested parties.

2. T-2 Pit also needs considerable work to meet current standards. Only the east side of the excavation has been adequately reclaimed. The north side has been reclaimed but the slope was plowed and ripped vertically which allowed erosion channels to form and revegetation to fail. That sector needs to be revisited and reworked. The northwest corner and west side contains various spoils piles that need redistribution and finishing. The Companies are agreed to fix the problems discussed above.

Consideration should be given to reducing the highwall on the south which is reposed at a steep angle and consists of loose and unstable aggregate material. The reviewers feel that as a general rule no highwalls consisting of unconsolidated materials should have been left standing and should have been reduced before the work site was abandoned.

Only the east side is adequately reclaimed which leaves approximately 75% of the total site to be completed.

3. Reduce steep road cuts in this area where they occur.
4. Repair or replace culvert under haul road or remove sediment from west end.

E. South 40 Acres.

1. Repair the erosion channel that has formed at the southeast corner of JG Pit as a result of runoff from the dump or develop a stable and permanent primary channel to accomodate runoff.

2. Repair several small gullies on the rim of JG Dump.

3. Repair sink holes in the haul road near JG Pit as agreed April 28, 1997.

4. By far the largest concern of the Tribes and the regulatory agencies is the final and satisfactory resolution to the present controversy regarding JC/JD/JF-1/JF-2 Pit series. This controversy has been amplified by the various permutations of the original mining plan that occurred before completion. The original language of the mining plan and the conditions of agreement stipulated that an open pit would remain after cessation of operations. At that time, no one envisioned the huge trench that was left after mining and there was never any expectation that reclamation of the site

would not occur. All parties agreed that an excavated depression would be acceptable when the process was completed but not everyone anticipated the huge, raw scar that remained. Modifications to the approved mine plan significantly reduced the amount of backfill available to the north and south ends. Another issue to be addressed is the reasonable expectation that only one pit would be left after operations ended instead of the four contiguous ones that actually exist. After inspection and consideration, the interested parties recommend that the following steps are the minimal acceptable pathways to final mitigation and remediation:

- Allow west highwall to stand with the unstable pockets at the top buttressed at the bottoms and monitored for human safety hazards.
- Exploit nearby material sources to initiate partial backfill of the trench.
- Consider reducing the east highwall to provide additional backfill material to place in trench bottom. It would be preferable to undertake this reduction even if existing slope standards are waived. Two parallel steep highwalls approximately 300 feet apart are not acceptable remnants in the final configuration of this operation.
- If necessary, access the JC Dump for additional materials for placement in the trench bottom.
- Another possibility would involve the utilization of the three mill shale piles east of the pits to stockpile in the top layer of the trench. This is a strategy that would at least temporarily provide additional fill.
- Regrade all materials thus obtained at a reasonable slope toward the west highwall.
- Regrade all materials from north to south in the trench bottom in a rolling and discontinuous configuration.
- Dress and harrow reconstituted surface before seeding.
- Reseed and fertilize in accordance with reclamation plan.
- Monitor site to assure adequate revegetation.

5. Repair or replace double culvert at Willow Creek Crossing with a leveled spillway lined with rock. Surplus material can be employed to backfill JD Pit or feathered into adjacent hillside. Allow stream crossing (ford) on rock-lined area to continue access to Bennet's Pass.

F. Other Considerations.

1. Detect and map all current weed infestations on the lease area and treat in early summer for three consecutive summers with appropriate herbicide applications.

2. Revisit all haul roads and repair surfaces where vertical channeling and erosion is occurring. There are locations on major haul roads that will not be successfully rehabilitated without water bars because of slopes, vertical ripping, and soil factors.

3. Protect all sensitive areas from livestock use by deployment of electric fence. These should be placed at those locations where the rehabilitation effort is being hampered by persistent livestock use.

4. Complete Tribal Park facility as agreed. BLM will coordinate with the Tribe in the development and approval of a site plan.

5. Resurvey and replace survey points and monumentation where needed. The BLM will develop cost estimates for a reimbursable agreement.

6. Monitor vegetative establishment and success for a least two growing seasons after closure and abandonment.

7. Continue water quality sampling for heavy metals, organic impurities, nonpoint source pollution, etc.

CONSULTATIONS WITH OTHERS

Bureau of Land Management, DOI

Jeff Steele, Pocatello Resource Area Manager
J. David Brunner, Deputy State Directory/Resources
Jeff Cundick, Mining Engineer
Fred Hagius, Mining Engineer
Howard Hedrick, Upper Snake Districts Manager
David A. Koehler, Rangeland Management Specialist (ISO)
Carolyn Chad, Rangeland Management Specialist (PRA)
Martha Hahn, State Director

Bureau of Indian Affairs, DOI

Sam Hernandez, Agricultural Engineer
Norman V. Bird, Supervisory Soil Scientist
June Boynton, Area Environmental Coordinator (Portland Area)
Jim LeBret, Area Geologist (Portland Area)
Geri Williams, Realty Officer
Gordon E. Cannon, Acting Agency Superintendent
Eric LaPointe, Superintendent

Shoshone-Bannock Tribes

Delbert Farmer, Former Tribal Chairman
Tony Galloway, Sr., Land Use Commissioner
Claudio M. Broncho, Tribal Councilman
Larry Bagley, Tribal Councilman
Hobby Hebewah, Land Use Commissioner/ Tribal Councilman
Louise Dixie, Paralegal
Albert Jones, Tribal Attorney
Chris Rule, Tribal Attorney
Marvin Tissidimit, Range Rider
Duane Thompson, Former Superintendent/ Tribal Councilman
Genevieve Edmo, Land Use Director

J.R. Simplot Co.

Larry Raymond, Manager of Resource Development
Vaughn Anderson, Consultant (Arrowhead Sands, Inc.)
Pat Avery, Environmental Engineer

FMC Corporation

Jim Simmons, Mining Engineer
Mike Sheffield, Environmental Coordinator
Ken Tandy, FMC

Attachment 3A

Fencing Removal Letter

Dated 11/7/2018

November 7, 2018

Kelly Wright
Shoshone Bannock Tribes
P.O. Box 306
Fort Hall, Idaho 83203

Subject: Work Plan for Fencing Removal

Dear: Mr. Wright,

This document provides details for proposed fencing removal.

Below are the proposed areas for fence removal. Over 6,800 feet of fencing is identified. One area in the East Limb has not been positively identified or estimated. The company's request that the tribes mark the fencing that is to be removed with pink flagging to confirm that we are removing the correct fencing. All fencing materials will be removed from the site and disposed of. The companies will contract with Kase Warbonnet for the fencing removal.

Headquarters Area – Approximately 2,600 feet



Fencing is on Overburden



Tribal Allotment 684 and Allotment 648



Owners of Allotment 648 based on 2012 agreements: Alberta Friday

East Limb – Approximately 2,600 feet Tribal Allotment 633, Allotment 971



Owners of Allotment 971 based on 2012 agreements: Rodney E Pahneeno, Jim W Nolan, Teresa Hardy, Sawyer Stan Farmer, Adolph Devinney, Joy B. Armajo

On Overburden



East Limb Approximately 2,500 feet

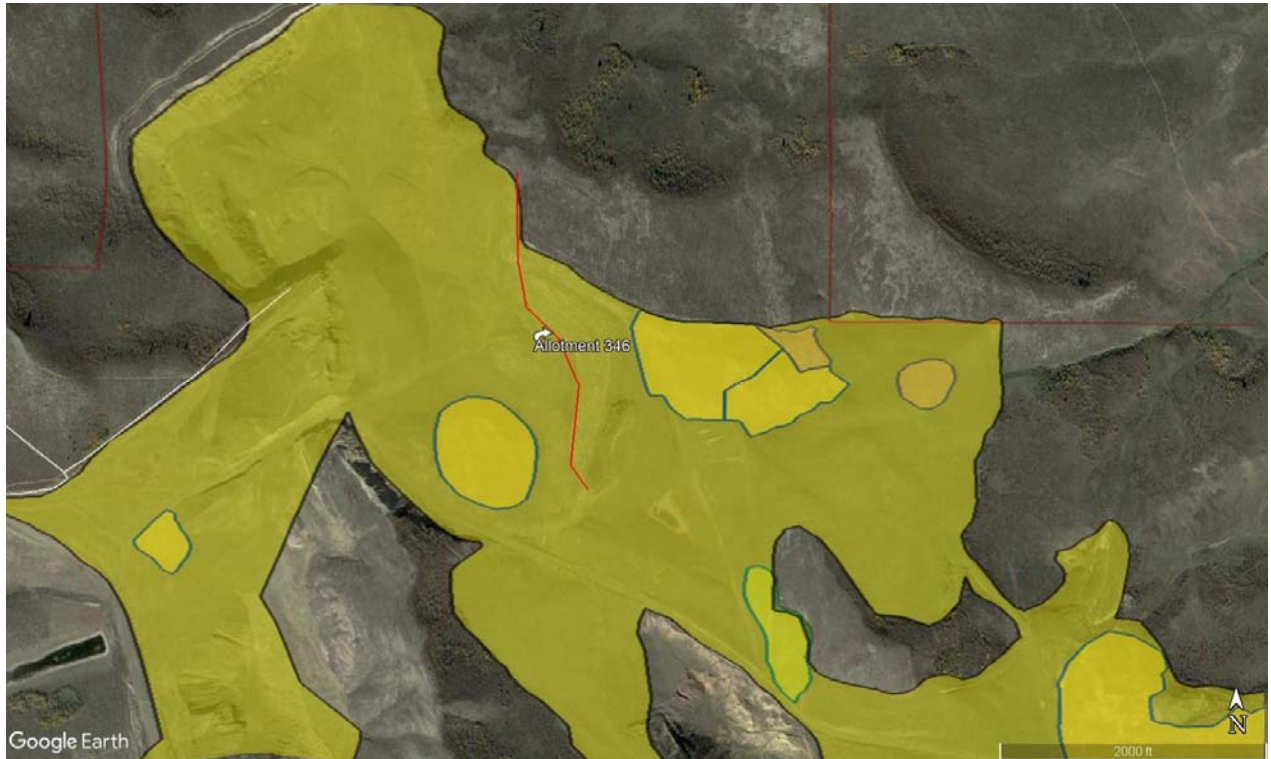


Allotment 346



Owners of Allotment 346 based on 2012 agreements: Tinno L. Keith, Vicky L Wettenbone, Michaeline Wettenbone, Michael L Whettenbone, Penoli Nevada, Frank R Papse Sr., Martin H Eugenia, William R. Jones,

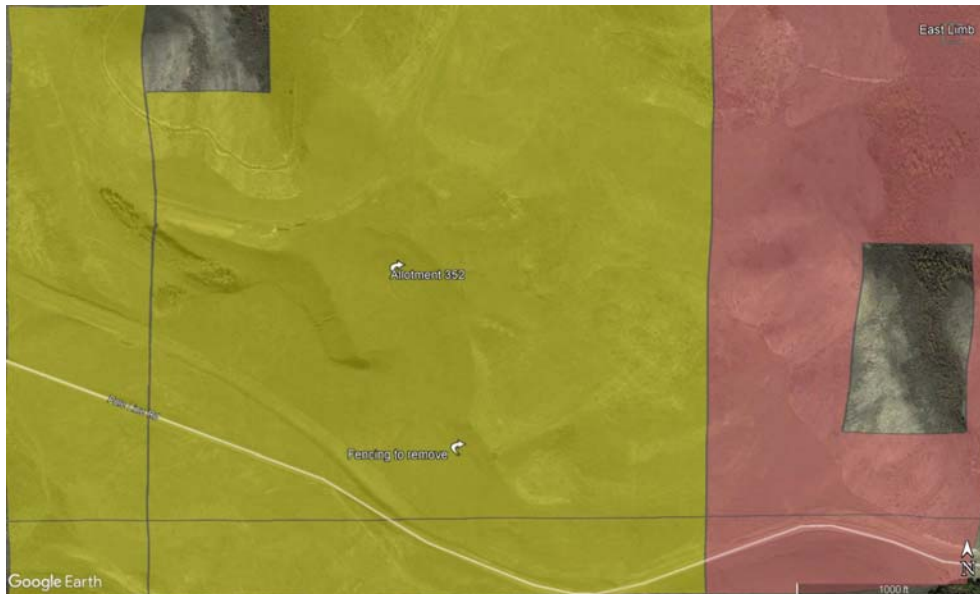
On overburden



East Limb unknown distance.



Allotment 352



On Mill Shale Pile



Owners of Allotment 352 based on 2012 agreements: Vicki L Wettenbone, Michaeline Wettenbone, Michael L. Wettenbone, Keith L. Tino, Penoli Nevada, Frank R. Papse, Eugenia H Martin, William Jones, Ronnie L. Hootchew, Dakota M Hoffman, Coby



J.R. Simplot Company
P.O. Box 912,
Pocatello, Idaho 83204

208 235-5600 Business

M Reese.

Please contact us if you have any questions.

Sincerely,

A handwritten signature in dark ink, appearing to read "Jeffrey Hamilton", written in a cursive style.

Jeffrey Hamilton
Environmental Engineer

Enclosures

cc: Joe Wallace, US EPA Region 10
Susan Hanson, Environmental Specialist
Rachel Greengas, FMC
Samantha Battle, FMC
Liz Davis, FMC
Lori Hamman, Simplot
Jeff Cundick, BLM
Colleen O'Hara, BLM
Adam Hill, SBT
Casper Appenay, SBT
Virginia Monsisco, SBT

Attachment 3

3B – Fending Removal Proposal – June 2019

June 7, 2019

Kelly Wright
Shoshone Bannock Tribes
P.O. Box 306
Fort Hall, Idaho 83203

Subject: Work Plan for Fencing Removal Revision #2

Dear: Mr. Wright,

This document provides details for proposed fencing removal.

Below are the proposed areas for fence removal. Over 21,600 feet of fencing is identified. One area in the East Limb has not been positively identified or estimated. The company's request that the tribes mark the fencing that is to be removed with pink flagging to confirm that we are removing the correct fencing. All fencing materials will be removed from the site and disposed of. GPS coordinates for the fence removal will be collected and provided to the tribes.

Headquarters Area – Approximately 2,600 feet



Fencing is on Overburden



Tribal Allotment 684 and Allotment 648



Owners of Allotment 648 based on 2012 agreements: Alberta Friday

East Limb – Approximately 2,600 feet Tribal Allotment 633, Allotment 971



Owners of Allotment 971 based on 2012 agreements: Rodney E Pahneeno, Jim W Nolan, Teresa Hardy, Sawyer Stan Farmer, Adolph Devinney, Joy B. Armajo

On Overburden



East Limb Approximately 2,500 feet

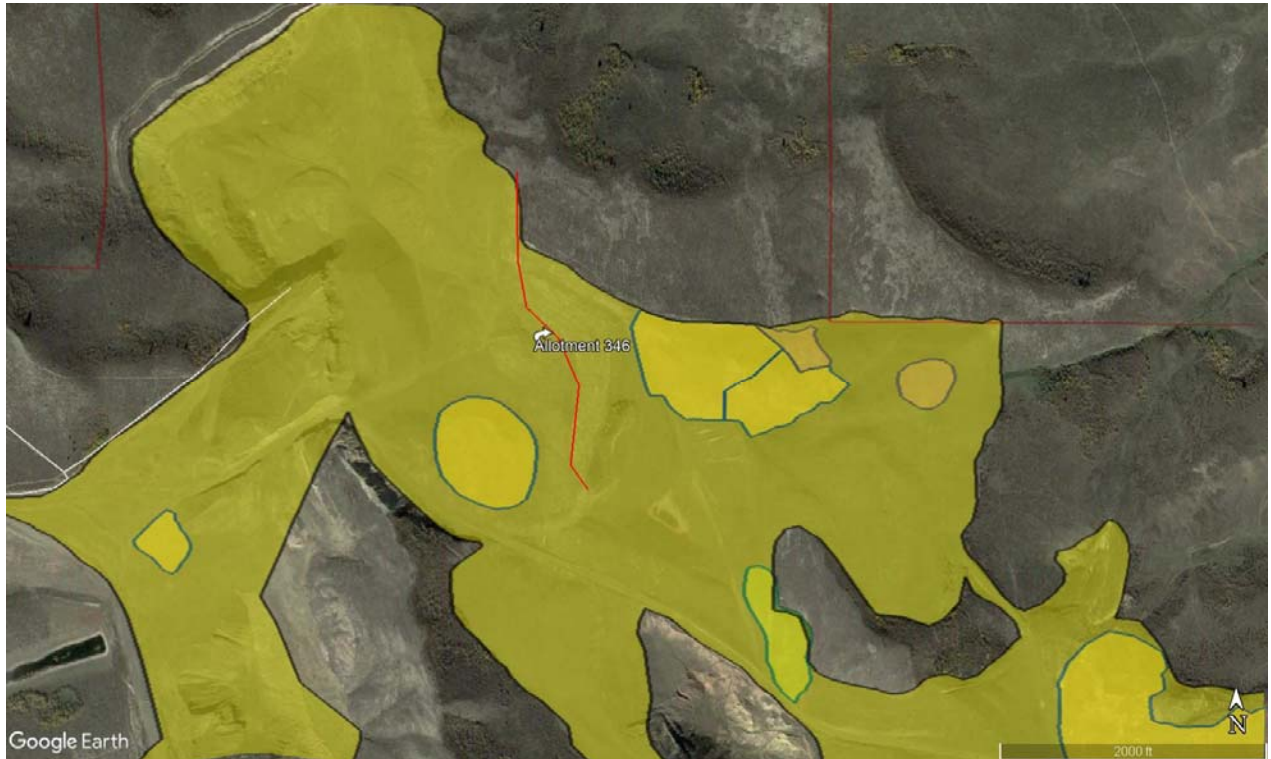


Allotment 346



Owners of Allotment 346 based on 2012 agreements: Tinno L. Keith, Vicky L Wettenbone, Michaeline Wettenbone, Michael L Whettenbone, Penoli Nevada, Frank R Papse Sr., Martin H Eugenia, William R. Jones,

On overburden



East Limb unknown distance.



Allotment 352



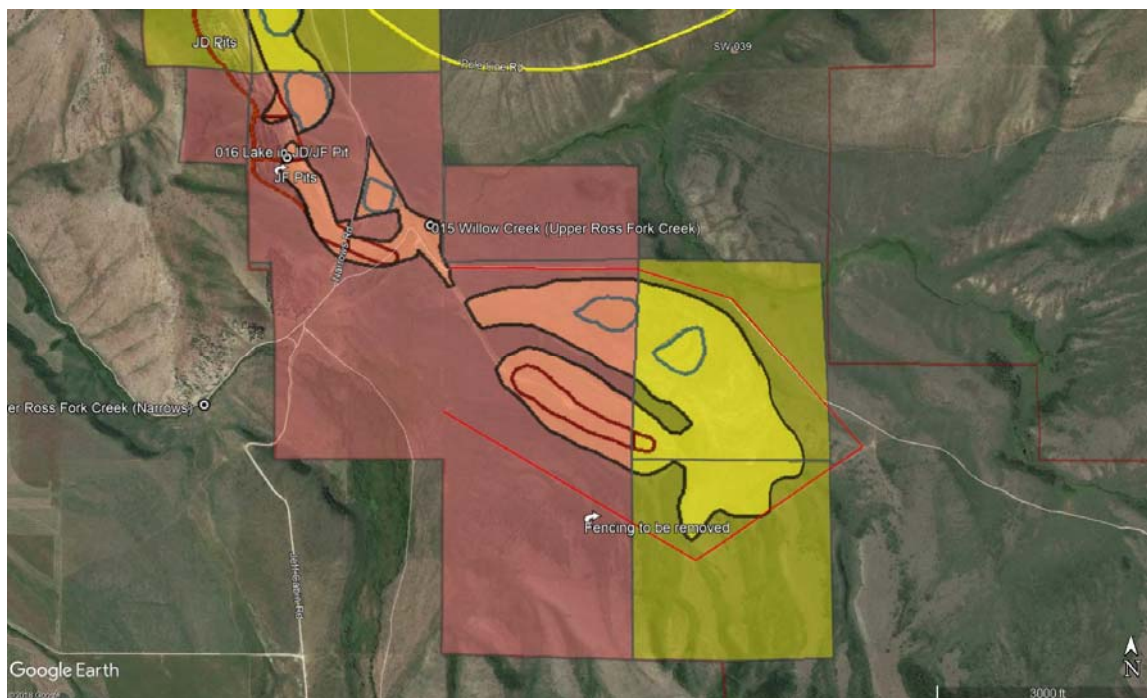
On Mill Shale Pile



Owners of Allotment 352 based on 2012 agreements: Vicki L Wettenbone, Michaeline Wettenbone, Michael L. Wettenbone, Keith L. Tino, Penoli Nevada, Frank R. Papse, Eugenia H Martin, William Jones, Ronnie L. Hootchew, Dakota M Hoffman, Coby

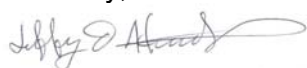
M Reese.

South 40 Fence Removal of 13,364 feet of fencing. Tribal Allotment 1329 and Private Allotment 233 and 838. Fencing is not on any mining waste.



Please contact us if you have any questions.

Sincerely,



Jeffrey Hamilton
Environmental Engineer

Enclosures

cc: Helen Butcher, US EPA Region 10
Susan Hanson, Environmental Specialist
Travis Stone, SBT
Rachel Greengas, FMC
Lori Hamman, Simplot
Jeff Cundick, BLM
Colleen O'Hara, BLM
Adam Hill, SBT
Casper Appenay, SBT
Virginia Monsisco, SBT

Attachment 3

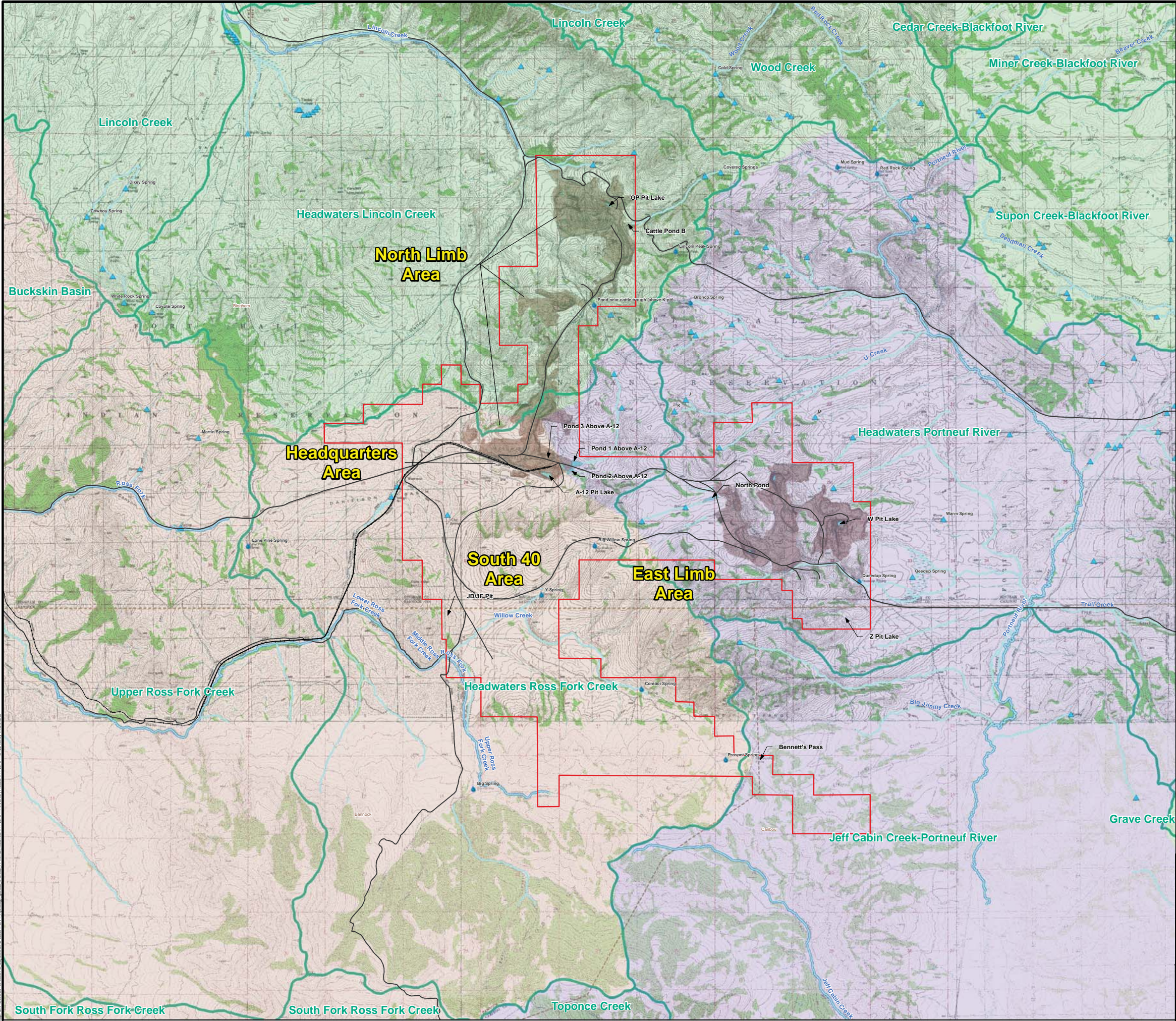
3C – Seed Mix

Gay Mine Proposed

Common Name	Release	Lbs PLS/ac	Percentage of lbs PLS/ac
Orchard grass	<i>Paiute</i>	4	6%
Meadow Brome	<i>Bromus marginatus</i>	10	16%
Slender Wheatgrass	<i>Revenue</i>	6	10%
Tall Wheatgrass	<i>Alkar</i>	10	16%
Mountain Brome	<i>Bromar</i>	6	10%
Sheep Fescue	<i>Covar</i>	4	6%
Small Burnet	<i>Delar</i>	16	26%
Alsike clover	<i>Trifolium hybridum</i>	2	3%
Blue Flax	<i>Linum perenne</i>	4	6%
Total			100%

Attachment 4

Gay Mine Pit Lake Locations



LEGEND

- Spring
- Spring Sampling Location
- Major Stream/River
- Minor / Perennial Waterways
- Railroad
- Road
- County Boundary
- CERCLA Site Boundary

Hydrologic Unit Code - Basin Name

- 17040206 - American Falls
- 17040207 - Blackfoot
- 17040208 - Portneuf

NOTES

This figure was originally produced in color. Reproduction in black and white or color scheme other than original figure may result in loss of information.

Shading on this figure represents the USGS interpretation of generalized disturbed mining areas as of 1981. This shading was on the original topographical map used for this figure and does not represent actual disturbed areas or areas disturbed after 1981.

REFERENCES

Map Projection:
State Plane Idaho East FIPS 1101 Feet
NAD 1983

Source: USGS (topo),
Idaho Department of Water Resources
(IDWR, Hydrologic Units (1:100,000) & Watersheds (1:24,000)),
USGS-NHD (streams), USGS-10m NED (elevation),
USGS, EMI Services, U.S. Bureau of Indian Affairs
(EMI C310.1.2, R2, 1-30-03, CERCLA Site Boundary),
Golder Associates Inc.

PROJECT/REPORT

GAY MINE
Project #: 103-93418-001.125
POCATELLO, BINGHAM COUNTY, IDAHO

TITLE

GAY MINE SITE - HYDROLOGY



PROJECT No.
103-93418-001.125

FIGURE 2.3-2

Attachment 5

2000 Gay Mine Reclamation/Pit Lake Proposal

**Gay Mine Reclamation
Final Phase**

Shoshone – Bannock Lands, Idaho

October 2000



Contents Gay Mine Reclamation Final Phase

Section 1.0 Introduction	1-1
1.1 Statement of Situation	1-1
1.2 Site History	1-1
1.3 General Setting	1-2
1.3.1 Geology and Hydrogeology	1-2
1.4 Mining and Reclamation	1-3
1.4.1 Leases and Royalties	1-4
1.4.2 Mining Regulatory Oversight	1-4
Section 2.0 Geochemical Considerations for Pit Backfill	2-1
2.1 Background	2-1
2.1.1 Selenium Release Mechanism	2-1
2.1.2 Regulatory Criteria for Selenium	2-2
2.2 Gay Mine Sampling and Analysis	2-2
2.3 Pit Lake Evaluation	2-3
2.3.1 Characterization of Pit Water	2-3
2.3.2 Characterization of Backfill Material	2-7
2.3.3 Predicting Water Quality Following Partial Backfill and Reclamation	2-7
2.3.4 Amendments to Partial Backfill	2-7
2.4 Summary	2-8
Section 3.0 Pit Reclamation Strategies	3-1
3.1 Methodology and General Assumptions	3-1
3.2 OP Pit Area	3-1
3.3 The A-12 Pit Area	3-2
3.4 The JF Pit Area	3-4
3.5 The Z Pit Area	3-5
Section 4.0 Gay Mine Lease Holding Summary	4-1
Section 5.0 Summary and Recommendations	5-1
Section 6.0 References	6-1

Section 1.0

Introduction

This report presents a summary of the final reclamation phase at the Gay Mine. Included is a discussion of reclamation alternatives for partial backfill of four remaining mine pit lakes. The approaches being evaluated are consistent with the Selenium Working Group and include implementation of Best Management Practices (BMPs) to limit selenium exposure in the environment.

1.1 Statement of Situation

In the early 1990s the Gay Mine complex was running out of economically extractable ore and the operations diminished until no further mining was possible. The years 1992, 1993, and 1994 were devoted primarily to reclamation efforts that included the demolition of mine buildings and mitigation of petroleum impacted soils in the mine yard area. Discussions between the BIA, the BLM, Simplot and FMC regarding final mine reclamation, bond release and relinquishment of the leases have been on-going. This process included an assessment by BIA and BLM of reclamation status at the mine site in 1996. A summary of this inspection was presented in the report, *Status of Reclamation Compliance at Gay Mine, Fort Hall Agency, Idaho* (Koehler and Hernandez, 1996-1997 attached in the appendix).

Reclamation discussions had advanced to a point where the issues for additional work were listed and generally agreed upon (May 1, 1998 letter with attachments to Arnold Appenay included in appendix) when the occurrence of selenium in the environment from mine waste became a concern in the phosphate mining region (also referred to as the Southeast Idaho Phosphate Resource Area (Resource Area)).

In response to potential selenium issues at active and inactive phosphate mines, the Idaho Mining Association established a Selenium Subcommittee

to identify the origin and environmental characteristics of selenium and other metals found in the Resource Area. The work from the Selenium Subcommittee identified areas within the Gay Mine that have potentially elevated selenium concentrations. Preliminary sampling results at the Gay Mine are summarized in Section 2.0.

Simplot and FMC requested that Brown and Caldwell initiate an evaluation of reclamation options for the remaining pit lakes at the Gay Mine. This evaluation complements the reclamation work previously completed and previous negotiations for the final phase of reclamation. This document is a summary of initial ideas based on sound field, technical, geologic and engineering best practices. This document will continue to be revised as additional input is incorporated. Additional efforts will be made to ensure that all work is consistent with the on-going area-wide and site specific selenium studies in southwestern Idaho. This would include BMP's, monitoring programs, data assessment, etc.

1.2 Site History

In June 1945, the Simplot Fertilizer Company was founded to satisfy the growing market demand for agricultural phosphate fertilizers in the western states. This demand soon outstripped the available supply of raw materials required for fertilizer production, prompting Simplot to seek additional supplies of phosphate ore. In June 1946, the Simplot Fertilizer Company, the Bureau of Indian Affairs (BIA), and the U.S. Geological Survey (USGS) reached an agreement with the Shoshone-Bannock Tribes on land lease and royalty rates for open-pit phosphate mining on the Fort Hall Indian Reservation. The Gay Mine was dedicated in 1948 and was one of the first open-pit phosphate mines to begin operation in southeast Idaho.

During the period of 1948 to 1949 operations at the Gay Mine rapidly expanded. Twenty-one miles of standard gauge rail line connecting Fort Hall to the mine was completed in 1948. In the following year, the Westvaco Chemical Division of FMC opened an elemental phosphorus plant for the processing of phosphate shale. Two grades of phosphate-bearing ore were taken from the Gay Mine. The lower (or furnace) grade "phosphate shale" was used by FMC in an electric furnace where the phosphate is reduced to its elemental form; the higher (or acid grade) "phosphate rock" was shipped to the Simplot plant (Don Plant) for fertilizer production.

Simplot and FMC continually upgraded the technology of mining operations, transportation, pit design, and reclamation, throughout the operation of the Gay Mine. Pits were typically 10 to 20 acres in size and 200 to 300-feet deep. In the 1980s and early 1990s, Simplot and FMC began to phase out production at the Gay Mine. Operation of the mine ended in the fall of 1993.

1.3 General Setting

The Gay Mine is located approximately 17 miles east of Fort Hall, Idaho (Figures 1-1 and 1-2). The majority of the mine is in Township 4 South, Range 37 East and Township 4 South, Range 38 East, Boise Meridian of the Lincoln Park quadrangle in southeast Idaho. It is found on the north end of the Portneuf Mountain Range, and on the east edge of the Columbia Plateau physiographic province. The climate is semi-arid with an annual precipitation average of 16.3 inches.

1.3.1 Geology and Hydrogeology

The Gay Mine area is part of the Idaho phosphate region, a large geologic region that includes portions of Bannock, Bear Lake, Bingham, Bonneville, Fremont, Teton and Madison Counties in southeastern Idaho. The Permian age Phosphoria Formation underlies a large portion of this area. The Meade Peak Member of the Phosphoria Formation contains commercially valuable phosphate deposits that are widely mined

in the region. It is approximately 200-feet thick and consists of interbedded mudstone, phosphorite, and argillite. The Wells Formation, a Pennsylvanian age limestone, is located beneath the Meade Peak Member. Overlying the Meade Peak is the Rex Chert Member of the Phosphoria Formation, a 155 to 160-foot thick sequence of cherty mudstone and limestone. Triassic age and Quaternary age alluvial deposits of the Thaynes and Dinwoody Formations are intermittently encountered overlying the Rex Chert Member (Ralston, 1986 and BLM, 1999).

The Fort Hall region is located along the southwestern edge of the Idaho-Wyoming fold and thrust belt. The belt is composed primarily of sedimentary rocks of Mississippian through Tertiary age, including the Phosphoria and Wells Formations. Subsequent post-Cretaceous folding has resulted in northwest trending structures along the fold belt. Quaternary alluvium is typically found in the valleys of these northwest trending ridges.

The Gay Mine is encompassed in the Fort Hall district of the Idaho phosphate region (USGS, 1978). At the Gay Mine, the primary structure is a north-trending, south-plunging, overturned syncline (Miller, 1977 and Mariah, 1986). Syncline limbs, containing the accessible phosphate reserves for mining, dip at approximately 15 to 30 degree angles. The fold is displaced by multiple high angle, normal faults, usually paralleling the strike of the formation. Minor smaller scale normal and reverse faults parallel the major normal faults and complicate the phosphate ore removal. Depth to the phosphatic formation varies significantly due to the folding of the formation. The valley area between the two limbs of the fold consists of Tertiary and Quaternary gravels. These gravels may extend to a depth of up to 300 feet (Mariah, 1986).

The Gay Mine area shows no evidence of a "regional water table". The area is located between two large regional groundwater systems, the Portneuf Valley aquifer to the east and the Snake River aquifer to the west (USGS, 1978). Localized occurrence of groundwater in the area is

determined by the water transmitting ability of the individual formations and the structural setting (Ralston, 1986). The Gay Mine area appears to consist of a multiple level, structurally controlled groundwater system. Ralston (1986) discussed the groundwater contacts and resulting variations in static water levels encountered during drilling activities in the East Gay Mine area and the Gay Mine Extension. Groundwater was encountered in the Dinwoody Formation in several of the borings at depths ranging from 75 to 120 below ground surface (bgs), but was not continuous across the sites. Hydraulic connection between this shallow alluvium and the deeper water systems does not appear to exist. Groundwater was often encountered in the Phosphoria Formation during exploratory drilling operations. There appears to be lower hydraulic conductivity zones within the Phosphoria Formation that cause a perched water system to exist at a static water level approximately 350 feet higher than in the Wells Formation

1.4 Mining and Reclamation

The phosphate mineral cryptocrystalline carbonate-fluorapatite occurs in strata that is generally steeply sloped and often interrupted by faults. Ore bodies frequently occurred in beds that were overturned or blocked by faults. The extraction of the ore body at the Gay Mine required removal of large deposits of overburden that consisted of chert, shales, and limestone.

As described in agency-approved mining and reclamation plans, the mining sequence was to complete the reclamation of each area as the mine operations moved on to new pits. Because of the relatively small size of the typical fault block ore deposit at the Gay Mine, there were usually two or three pits in various stages of mining at one time. The multiple pit method help facilitate backfilling, an important step in mine land reclamation. The general pattern of mining was for removal and stockpiling of topsoil and alluvium for future reclamation. Then, overburden (chert, shales, and limestone) was removed by ripping and blasting. This overburden was used to fill previously mined pits and remaining overburden went to external

dumps. This approach resulted in concurrent reclamation as the mining progressed throughout the various deposits within the mine leases. This "backfill as you go" type system left the final pit in a series with minimal backfill and the final reclamation plan usually included shaping and revegetation that best suited the specific area.

Low-grade phosphatic shale (mill shales) have been stockpiled on-site in several locations. The shales have potential for beneficiation into a product, depending on economic conditions.

The 1986 *Environmental Assessment Report, Gay Mine Expansion Area, Fort Hall Reservation, Idaho* (Mariah, 1986) describes the history of reclamation at the Gay Mine, which has included cooperative efforts with the Natural Resource Conservation Service, the BIA, the Bureau of Land Management (BLM), the Tribe, and university researchers. The general reclamation sequence, as described in the Environmental Assessment (EA), is summarized:

- Step 1. Placement of rock core material at base of waste dumps to provide drainage.
- Step 2. Backfilling of mine pits, shaping of dumps to smooth contours and final grading.
- Step 3. Topsoil placement.
- Step 4. Primary tillage in the form of shallow ripping. Deep ripping of compacted areas such as haul roads.
- Step 5. Spreading of fertilizer and disking or harrowing.
- Step 6. Seeding.
- Step 7. Monitoring of revegetation success.

As described above, reclamation activities were conducted concurrently with mining activities throughout the mine life at the Gay Mine. Discussions regarding final reclamation activities and relinquishment of leases are on-going between Simplot, FMC, the BLM, and BIA, and the Tribe.

1.4.1 Leases and Royalties

There are two basic types leases at the Gay Mine:

Mining leases – for the removal or physical extraction of overburden and phosphate ore for specified sites.

Business leases – for road and other facility construction and placement and storage of materials.

Some leases were held jointly by Simplot and FMC while others were held separately. A compilation of bonds and leases are further described in Section 4.0.

1.4.2 Mining Regulatory Oversight

In 1984, the BIA (Portland) and BLM (Alaska, Oregon/Washington, Idaho, and Montana offices) signed a Memorandum of Understanding that states:

Federal involvement will begin when a Federal decision is needed regarding surface disturbances, access, confirmation of mineral rights, or approval of permits, leases, and plans, under Titles 25 and 43 of the Code of Federal Regulation. The BLM has responsibility for supervision of mineral developments including leasing of Federal lands, and trust responsibility for approval and management of mineral exploration and mine plans on Indian mineral lands. The BIA has the lead Federal trust responsibility for issuance and general administration of mineral-permits, leases and bonds on Indian mineral lands

Prior to 1974 there were no specific requirements in the federal regulations for land reclamation subsequent to mining. In 1973, the Indian Trust Lands were brought under protection and jurisdiction of the National Environmental Policy Act (NEPA) of 1969. NEPA mandates that all Federal agencies protect and enhance the quality of the environment and submit all proposed actions on Federal lands to a described analytical process. Environmental Assessments (EAs) were required on all public land action that could cause environmental impacts not previously analyzed. Environmental Impact Statements were required for any Federal action significantly affecting the quality of the environment. The first EA for the Gay Mine was prepared in 1974.

Section 1.0 has presented a brief description of site history at the Gay Mine, a summary of the mining sequence and reclamation activities, and a brief description of the selenium issues. Section 2.0 further describes selenium issues and potential mitigation approaches. Section 3.0 describes pit lakes at the Gay Mine that are candidates for reclamation. In addition, potential strategies for final reclamation are described. Pertinent lease information is described in Section 4.0. Finally, recommendations and discussion for moving forward toward final reclamation are presented in Section 5.0.

Section 2.0

Geochemical Considerations for Pit Backfill

2.1 Background

In 1996, several horses being pastured near Maybe Creek in southeast Idaho, downstream of a historic phosphate mine, were diagnosed with chronic selenosis. In response to elevated selenium levels in soils and surface water in the area, the Selenium Sub-committee, a voluntary, ad hoc committee of the Idaho Mining Association, was formed in spring 1997. The Selenium Sub-committee consists of five mining companies (FMC Corporation, J.R. Simplot Company, Nu-West, Rhodia, Inc. and P4 Production LLC) that are currently mining or who have recently mined phosphate ore in southeast Idaho (Montgomery Watson, 1999a).

In addition to the Selenium Sub-committee, the Selenium Working Group, comprising the committee member companies and involved federal, state, local, and tribal agencies, was formed. The Selenium Working Group has moved forward with characterization of the impacts from selenium associated with the phosphate mining facilities. This characterization includes:

- Identification of possible mine sources
- Description of the extent and magnitude of selenium impacts to surface water, groundwater, soil, vegetation, aquatic life and wildlife
- Evaluation of transport mechanisms.

A regional investigation (the Selenium Project) consisting of sampling and analysis of mine pits, waste rock dumps, seeps, streams and other potential sources has been undertaken since the fall of 1997 to evaluate the existing impacts (Montgomery Watson, 1999a). This project is on going, with additional sample collection expected

in 2000. Part of these sampling activities has included surface water, vegetation, and soils in and around the Gay Mine.

2.1.1 Selenium Release Mechanism

Selenium is a naturally occurring element found in phosphate ore and associated with shale waste rock. Based on recent study results, the middle waste shale within the Meade Peak Phosphatic Shale appears to be a major source of selenium. When this shale is exposed to air and water, oxidation of the selenium may occur resulting in the formation of selenate, a highly soluble and mobile form of selenium that can be readily available for uptake by plant root systems (Montgomery Watson, 1999b). The selenium in these shales is naturally occurring and is not a waste product of mining. Rather, mining activities have exposed this shale material to oxygen and water resulting in the enhancement of the oxidation process where selenium is converted to its more mobile form.

The 1998 data collected by the Selenium Working Group has shown elevated levels of selenium associated with the following phosphate-mining facilities:

- Seeps/springs influenced by surface water runoff or infiltration at mine waste rock piles
- Water flow from drains below waste rock piles
- Ponds located in mine pits, constructed on or from waste rock, or receiving runoff from waste rock
- Vegetation growing on waste rock piles or growing downgradient from water flow from waste work piles.

2.1.2 Regulatory Criteria for Selenium

Selenium is recognized as a required micronutrient by fish, birds, mammals (including humans). In fact, selenium is often supplemented in livestock diets in areas where selenium is deficient in forage (including much of southeastern Idaho). At high levels, however, selenium can cause chronic or acute selenosis. The U.S. EPA has established a human health drinking water standard (Maximum Contaminant Levels (MCL)) for selenium at 50 micrograms per liter, $\mu\text{g/l}$ (parts per billion). The Aquatic Biota Cold Water Standard (ABCWS) for protection of aquatic life has been set by the U.S. EPA at 5 $\mu\text{g/l}$.

2.2 Gay Mine Sampling and Analysis

The Selenium Project has identified active and inactive phosphate mines in southeast Idaho, where potential selenium concerns may occur. The Gay Mine was identified as an inactive phosphate mine. Thirty potential stream sampling locations for the Gay Mine were identified in the Sampling and Analysis Plan (SAP) (Montgomery Watson, 1998). These locations were selected to characterize surface water quality on both the upstream and downstream stream sections in relationship to the mine. Four locations were sampled in 1997 and six locations were sampled in 1998. Sediment samples were also collected from these locations. The SAP explains sampling methodology, analytical methods and quality control/quality assurance criteria. A summary of analytical laboratory test results is presented in Table 2-1 for selenium and cadmium. Additional surface water sampling locations including pit lakes, waste rock dumps, seeps, french drain systems and stock ponds as identified in the SAP. Two pit lakes were sampled in 1997. During the 1998-sampling season, three pit lakes and three waste rock dumps at the Gay Mine were sampled for water and soil. Analytical laboratory test results are summarized in Tables 2-2 and 2-3, respectively for selenium and cadmium. Sample locations are illustrated on Figure 2-1.

Surface water results from the stream samples and pit lake samples were evaluated against the

ABCWS for selenium of 0.005 milligrams per liter (mg/l) (this is equivalent to 5 $\mu\text{g/l}$, ppb) developed by the U.S. EPA under the Clean Water Act. None of the analytical laboratory test results from the stream segment locations associated with the Gay Mine exceeded the ABCWS in 1997 or 1998. Sample results from Gay Mine Z Pit Lake (SP026) and JF Pit Lake (SP027) exceeded the standard for each sample analyzed. Selenium sediment sample results from these two areas (Z Pit Lake = 17 mg/kg and JF = 17 mg/kg) were evaluated against the Upper Confidence Limit (UCL) of background samples (see Montgomery Watson (1998a and b) for discussion of background sample determination). (Note: References to JD Pit Lake by Montgomery Watson is the same location referred to as JF by Brown and Caldwell in this report.)

Cadmium water concentration results are also included in Tables 2-1 and 2-2. The cadmium ABCWS is a water hardness dependent value that is developed based on information collected during the sampling event (Montgomery Watson, 1999a). These values are listed in italics adjacent to the analytical test results in the tables. Laboratory test results of the May 1998 sampling event indicate three of the six stream segment samples exceeded the appropriate cadmium standard. No exceedance was reported for the stream samples during the September 1998 sampling. Cadmium sediment sample results from September 1998 were evaluated against the background UCL developed for cadmium (8.8 mg/l). Analytical laboratory test results were below the UCL for all six-stream sediment samples. Pit Lake water and sediment sample results for cadmium were evaluated in a similar manner. Two of the three samples in May 1998 and one of the three samples in September 1998 exceeded the applied hardness dependent standard. The Z Pit Lake and JF Pit Lake sediment results exceeded the cadmium UCL.

Waste rock samples were collected from five locations within each of the three waste rock dumps totaling 15 samples. Since there is no promulgated standard for evaluation, analytical laboratory results were compared to the UCL of

the background soil samples. Background soil samples were collected from three locations with five samples collected in each location. Using a value of 8 milligrams per kilogram (mg/kg) for evaluation, 12 of the 15 samples collected from the Gay Mine Waste Rock Dumps exceeded the UCL for selenium (Montgomery Watson, 1999a). Two of the five samples from East Limb Dump 4E and one sample from the North Limb O/P Fill Dump were below the UCL. Thirteen of the fifteen waste rock dump soil sample cadmium results exceed the background UCL of 23 mg/kg.

2.3 Pit Lake Evaluation

The mining sequence at the Gay Mine included the backfilling of pits concurrently with active mining. The pits described in Section 3.0 were generally at the end of the mining sequence, where overburden was not readily available for backfilling. Options for partial backfilling and descriptions for backfill materials are described in Section 3.0. Pits JF and Z were sampled and have selenium concentration values above ABCWS. The goal is to partial backfill these pits so that there is no surface water and to reclaim the sites with low selenium bearing surface material to support vegetation.

Simplot and FMC have extensive experience in the reclamation of mine pits at the Gay Mine, including pits containing water. In the past, reclamation of pits has been in accordance with approved reclamation plans. Further action related to the remaining pits will require consideration of selenium and possibly cadmium. Pit lake reclamation options have been addressed during the Environmental Impact Statements (EIS) activities at the Dry Valley Mine and the Smokey Canyon Mine. These EIS activities have included consideration of groundwater quality associated with pit backfilling.

An important consideration in pit lake partial backfilling and reclamation is understanding the source of pit lake water. Depending upon pit location and topography, water in pits may be a result of surface water, subsurface water, or a combination of both. Final reclamation of pits involves recontouring the pit area so that surface

water accumulation on top of the reclaimed pit is minimized. Subsurface water sources that may enter a pit include seeps, springs, localized perched water tables or area wide groundwater. An understanding of the source of this water is important to predict water rebound in the reclaimed pit and also to predict groundwater outflow. Influent groundwater chemistry, backfill type and degree of weathering, and the concentrations of dissolved oxygen and carbon dioxide in the pit water will control the quality of groundwater moving through pit backfill.

2.3.1 Characterization of Pit Water

As described above, it will be necessary to develop an understanding of the source of water in each of the pits. This evaluation may be accomplished as follows:

- Characterize vertical profile of water in each pit lake through sampling and geochemical analysis, and monitoring activities. Laboratory analysis should include major ions, nutrients, total metals, and dissolved metals. Field analysis should include temperature, pH, redox potential, electric conductivity, and dissolved oxygen. Knowledge of the vertical profile will help develop an understanding of water sources (e.g., groundwater versus stormwater).

Install groundwater-monitoring wells up and down gradient of the pit to determine depth to groundwater and evaluate possible

Table 2-1. Summary of Stream Sampling Data for 1998 at the Gay Mine, Fort Hall Region, Idaho

Station Number ¹	Drainage	Description	Selenium Concentrations in Water (mg/l ²)			Selenium Concentrations in Sediments (mg/kg ³)
			September 1997	May 1998	September 1998	September 1998
ST001	Portneuf River	Downstream of Bakers Creek	NA ⁴	0.00047	0.00058	2.5
ST004		Upstream of U Creek	NA	0.00045	0.00063	1.2
ST013	Ross Fork	Downstream of Danielson Creek	0.0005	-0.000080	-0.00043	1.3
ST015		Upstream of South 40 Unit	0.0005	0.00030	0.000097	2.2
ST031	Lincoln Creek	Downstream of Dry Hollow Creek	0.0009	0.0023	0.00013	2.9
ST033		Upstream of North Limb Unit	0.0007	0.00062	0.0000072	1.7
<i>Aquatic Biota Cold Water Standard⁵</i>			0.005	0.005	0.005	
<i>Sediment Upper Confidence Limit⁶</i>						2.3
Station Number	Drainage	Description	Cadmium Concentrations in Water/ Cold Water Criteria (mg/l) ⁷		Cadmium Concentrations in Sediments (mg/kg)	
			May 1998	September 1998	September 1998	
ST001	Portneuf River	Downstream of Bakers Creek	0.00047/0.0029	0.00058/0.0028	2.5	
ST004		Upstream of U Creek	0.0019/0.0023	0.0018/0.0022	2.4	
ST013	Ross Fork	Downstream of Danielson Creek	0.0021/0.00098	-0.00061/0.0014	2.5	
ST015		Upstream of South 40 Unit	0.0035/0.0030	-0.0012/0.0031	5.7	
ST031	Lincoln Creek	Downstream of Dry Hollow Creek	0.0030/0.0033	-0.00013/0.0031	5.7	
ST033		Upstream of North Limb Unit	0.0040/0.0025	0.00029/0.0023	3.1	
<i>Sediment Upper Confidence Limit⁶</i>					8.8	

Explanation

1—Sample location shown on Figure 2-1

2—mg/l is milligrams per liter, which is equal to parts per million

3—mg/kg is milligrams per kilogram, which is equal to parts per million

4—NA is not analyzed

5—Aquatic Biota Cold Water Standard for Selenium as established by EPA

6—Upper confidence limit based on the 95% upper confidence limit on the 95th percentile of the background data (Montgomery Watson, 1999a)

7—Cold water criteria is a hardness dependent value (Montgomery Watson, 1999a).

Table 2-2. Summary of Pit Lake Sampling Data for 1998 at the Gay Mine, Fort Hall Region, Idaho

Station Number ¹	Facility Type	Facility Name	Selenium Concentrations in water (mg/l ²)			Selenium Concentrations in Sediments (mg/kg ³)
			September 1997	May 1998	September 1998	September 1998
SP025	Stock Pond	Gay Mine W Pit Lake	0.0004	0.00052	0.00081	1.2
SP026	Stock Pond	Gay Mine Z Pit Lake	0.06	0.055	0.062	17
SP027	Stock Pond	Gay Mine JD Pit Lake	NA ⁴	0.052	0.059	17
<i>Aquatic Biota Cold Water Standard⁵</i>			0.005	0.005	0.005	
<i>Sediment Upper Confidence Limit⁶</i>						2.3
Station Number	Facility Type	Facility Name	Cadmium Concentrations in water/ Cold Water Criteria (mg/l) ⁷		Cadmium Concentrations in Sediments (mg/kg)	
			May 1998	September 1998	September 1998	
SP025	Stock Pond	Gay Mine W Pit Lake	0.0035/0.0020	0.0036/0.0024	6.4	
SP026	Stock Pond	Gay Mine Z Pit Lake	0.0023/0.0024	0.0014/0.0022	32	
SP027	Stock Pond	Gay Mine JD Pit Lake	0.0052/0.0032	0.00084/0.0030	32	
<i>Sediment Upper Confidence Limit⁶</i>					8.8	

Explanation

1—Sample location shown on Figure 2-1

2—mg/l is milligrams per liter, which is equal to parts per million

3—mg/kg is milligrams per kilogram, which is equal to parts per million

4—NA is not analyzed

5—Aquatic Biota Cold Water Standard for Selenium as established by EPA

6—Upper confidence limit based on the 95% upper confidence limit on the 95th percentile of the background data (Montgomery Watson, 1999a)

7—Cold water criteria is a hardness dependent value (Montgomery Watson, 1999a).

Table 2-3. Summary of Waste Dump Soil Sampling Data for 1998 at the Gay Mine, Fort Hall Region, Idaho

Station Number ¹	Facility Type	Facility Name	Selenium Concentrations in soil (mg/kg ²)	Cadmium Concentrations in soil (mg/kg ²)
WD-19-1	Waste-Rock Dump	Gay Mine North Limb O/P Fill	7.2	26
WD-19-2	Waste-Rock Dump	Gay Mine North Limb O/P Fill	15	44
WD-19-3	Waste-Rock Dump	Gay Mine North Limb O/P Fill	22	44
WD-19-4	Waste-Rock Dump	Gay Mine North Limb O/P Fill	8.7	40
WD-19-5	Waste-Rock Dump	Gay Mine North Limb O/P Fill	16	35
WD-31-1	Waste-Rock Dump	Gay Mine East Limb Dump 4E	18	65
WD-31-2	Waste-Rock Dump	Gay Mine East Limb Dump 4E	2.3	15
WD-31-3	Waste-Rock Dump	Gay Mine East Limb Dump 4E	31	76
WD-31-4	Waste-Rock Dump	Gay Mine East Limb Dump 4E	10	37
WD-31-5	Waste-Rock Dump	Gay Mine East Limb Dump 4E	1.8	19
WD-34-1	Waste-Rock Dump	Gay Mine East Limb Dump 19	33	41
WD-34-2	Waste-Rock Dump	Gay Mine East Limb Dump 19	17	64
WD-34-3	Waste-Rock Dump	Gay Mine East Limb Dump 19	17	72
WD-34-4	Waste-Rock Dump	Gay Mine East Limb Dump 19	17	77
WD-34-5	Waste-Rock Dump	Gay Mine East Limb Dump 19	11	63
<i>Background Station Samples³</i>		<i>Upper Confidence Limit⁴</i>	8	23

Explanation

1—Sample location shown on Figure 2-1

2—mg/kg is milligrams per kilogram, which is equal to parts per million

3—Sample locations outside area of potential impact

4—No promulgated standard, value represents 95th confidence limit on the 95th percentile of background data (Montgomery Watson, 1999a)

- outflow from the current pit lakes. Groundwater analyses should be the same as those for the pit lake water. These wells would also serve for post reclamation monitoring.

2.3.2 Characterization of Backfill Material

The characterization of backfill material may be necessary in order to predict water quality in the reclaimed pit. Based on data collected in conjunction with the Selenium Working Groups regional investigation, it appears that backfilling and submerging of waste shale material into pit water decreases the potential for oxidation and mobilization of selenium in the backfill. This approach also allows for recovery of waste shale overburden from nearby dumps and consolidation as pit backfill. In area plant uptake, non-shale material would be used as growth medium over the pit water backfill. The choice of backfill material will require further evaluation given that the degree of weathering of waste shale material is expected to vary depending upon the age of the material. Extraction tests of overburden material (e.g., SPLP procedure) may be warranted to provide an estimate of pit lake water quality following backfilling.

2.3.3 Predicting Water Quality Following Partial Backfill and Reclamation

There are two potential approaches for characterizing water quality associated with partial backfill and reclamation:

- Develop a detailed hydrogeochemical model of groundwater-backfill interaction for the purpose of predicting interstitial water quality. Such a model will require data regarding the geochemistry and lithologic distribution of fill in each pit.
- The second option is to sample groundwater from historically backfilled pits to assess actual quality.

The sampling and analysis of groundwater in the backfilled portion of existing reclaimed pits provides actual data representative of in-situ geochemical interactions. Based on discussions with former mine personnel, there are several

reclaimed pits that would be expected to have water within the backfill material. It may be possible to sample several pits, each representing a different backfilling period. Knowledge of lithology is important so that water quality in the pit can be correlated with rock type. This information will be valuable in designing final partial backfill for the four pits described in Section 3.0.

For the Dry Valley EIS evaluation for backfilling pit lakes, this approach was used by completing a monitoring well into backfilled Pit B. In addition, there were several upgradient and downgradient monitoring wells. The data from this study indicated that water within the pit backfill exceeded MCLs for antimony, cadmium, and nickel. Secondary MCLs were exceeded for TDS, sulfate, and manganese. Selenium ranged from 8 to 43 µg/l, below the MCL of 50 µg/l. It was concluded from the EIS that as water migrates from the pit, chemical constituents would be subject to dilution and attenuation mechanisms. These factors will likely be sufficient to reduce concentrations of constituents in groundwater to levels that meet water quality standards.

This experience suggests that this approach could provide useful information for predicting water quality in partially backfilled pits.

2.3.4 Amendments to Partial Backfill

If water quality in proposed reclaimed pits becomes a concern, the addition of an organic amendment to the pit lakes during backfilling operations may be a viable option. The addition of such an amendment enhances reduced conditions (low oxygen) thus favoring the removal of selenium and other metals from solution. This approach has been implemented at several hard rock mines where anoxic conditions were desired to remove oxidation of sulfide bearing waste rock. The University of Idaho in cooperation with Simplot is currently conducting research using organic amendments for surface water treatment of selenium.

2.4 Summary

The general approaches toward pit lake reclamation described in Sections 2 and 3 are consistent with the Best Management Practices (BMPs) that have been developed by the Selenium Working Group. The purpose of the BMPs, and the pit lake reclamation strategies described herein, is to address and control the release of selenium into the environment. In addition, the significant reclamation efforts made by Simplot and FMC at the Gay Mine are consistent with BMP recommendations presented by the Selenium Work Group in the document, Draft Existing Best Management Practices at Operating Mines, December 1999 (prepared by Montgomery Watson).

Section 3.0

Pit Reclamation Strategies

The following pits were evaluated for partial backfilling and reclamation:

- OP Pit
- A-12 Pit
- JF Pit
- Z Pit

Based on sampling activities, it is anticipated that OP Pit, A-12 Pit, JF Pit, and Z Pit have elevated levels of selenium (Montgomery Watson, 1999a). General reclamation strategies for each pit are presented below. Methodology and general assumptions used for pit backfill volume calculations are also described below.

3.1 Methodology and General Assumptions

Brown and Caldwell was unable to locate as-built reclamation drawings and survey data for the study pits as they exist today. Some of the last pit maps for Z and A-12 Pits were used to estimate the final pit dimensions, but it still did not provide a plan of how the pits were reclaimed.

The preliminary design criteria considered and include input from all of the following areas.

- A design that is consistent with and takes into account the remaining items of reclamation listed in the May 1998 letter to Appenay. (Appendix).
- Minimization of land disturbance in either the cut or fill areas.
- Revegetation of all redistributed areas with the seed mix that has been recommended by the work of the Selenium Study.
- Optimization of cuts and fill areas to balance the onsite work functions.

- Location of fill borrow areas that's efficient for construction practices and that provides proper material characteristics.
- Best engineering practices for each specific area.
- All considerations focused on immediate results that provide long term solutions.
- Eventually arriving at an overall plan that will return all lands back to the full control of the owners.

Brown and Caldwell inspected each pit and made visual estimates of pit dimensions and visual estimates on the availability of fill material. The on-site inspections were also useful in appreciating the unique setting of each area and the realization that each pit requires its own specific plan. More detailed surveys will be required to support a more detailed reclamation design.

3.2 OP Pit Area

This investigation focused on the OP-Pit, also referred to as the P-Pit. The visit to the P Pit area also allowed review of the K, R, C and O-Pits. Photos were taken of the pits, though selenium concerns are primarily limited to the P Pit. The area is shown in Photos 3.2-1 through 3.2-13 and Drawing P. The area is at the northern end of the North Limb and represents the northern extent of mining. Lincoln Road and Blackfoot can be seen from the northwest end of the P Pit. The P Pit has water in the bottom with evidence of water level fluctuations throughout the year. There was also evidence of livestock and wildlife access in the area.



Photograph No. 3.2-1
O Pond looking to P Pit
3/2/00



Photograph No. 3.2-2
Small trapped pond at O Area. No outlet. Water area for cows.
3/2/00



Photograph No. 3.2-3
P Pit and pond
3/2/00



Photograph No. 3.2-4
P Pit from NW end
3/2/00



Photograph No. 3.2-5
P Pit NE wall
3/2/00



Photograph No. 3.2-6
P Pit NE wall from SE end
3/2/00



Photograph No. 3.2-7
P-Pit looking from NW end looking SE
3/2/00



Photograph No. 3.2-8
P Pit from above
3/2/00



Photograph No. 3.2-9
P Pit SE end from above
3/2/00



Photograph No. 3.2-10
P Pit from above
3/2/00



Photograph No. 3.2-11
P Pit looking NW as potential drainage area
3/2/00



Photograph No. 3.2-12
Lincoln Road from NW end of P Pit
3/2/00



Photograph No. 3.2-13
NW to Blackfoot potential drainage from P Pit
3/2/00

The O Pit has been reclaimed and has a small pond that is accessed by livestock. The pond is in a low lying area where stormwater appears to accumulate. Pond volume appears to seasonally fluctuate. It has not been determined whether this pond water has elevated selenium concentrations. If future sampling defines a problem, then the pond can be easily filled from the surrounding material. The general observation is that the water in the pond is on reclaimed material and is not in contact with the selenium bearing material. If this pond has selenium below regulatory aquatic standards, then it should be left as a water source for livestock and wildlife.

The P Pit pond samples have shown elevated levels of selenium and the reclamation may include a system that eliminates the pond or covers the selenium bearing seams. The pit has two highwalls with seam outcrops on the north wall. Several options were considered and are described below.

Option 1 — Fill Above the Exposed Seams

This option is based on the premise that the seams that are visible on Photos 3.2-3 and 3.2-5 will need to be covered with fill material and the top layer of the fill compacted to reduce infiltration of water. The height of the fill required to cover the seams and leave the final slope at a 3:1 angle will raise the floor level of the pit such that the water may drain out to the northwest and no pond will occur in the pit. The water will follow the natural drainage and join Lincoln Creek (see Photos 3.2-11, 12, and 13). Another alternative would be to drain this water away from Lincoln Creek and establish a stormwater retention structure. The final fate of this water would depend partly on predicted water quality.

The method of filling would be to add fill to the bottom of the pit until a 3:1 slope could be developed to cover the seams. In this option, the fill will be pushed from the north highwall into the pit using dozers. The material of the highwall may need to be ripped or even blasted to enable

the dozers to move the amount of fill necessary. An average push distance of 250 feet was assumed for this option. The other required work for this option includes revegetation of the fill and borrow areas and the development of the drainage ditch in the new pit bottom.

The summary of the functions specific to this option is as follows:

- Ripping and minimal blasting
- Dozer pushing from the north highwall
- Revegetate the fill/borrow areas
- Develop the drainage ditch

Option 2 — Drill, Load and Cast Blast the North Highwall

The configuration of the north highwall may allow the use of cast blasting technology. In this option, the north highwall would be drilled and cast blasted into the P Pit. The material would be shaped using a dozer (approximately 40,000 loose cubic yards (lcy)) and the blasted/fill areas will be revegetated. A drainage ditch would be developed in the new pit bottom to convey water to the Lincoln Creek drainage or to a retention pond. The summary of the functions specific to this option is as follows:

- Drill, load and blast the north highwall
- Dress and slope with a dozer
- Revegetate the fill/blast areas
- Develop the drainage ditch

Option 3 — Fencing

Installation of a wildlife fence above the high-water line of the pond. This does not mitigate the selenium concerns within the pond, but keeps livestock and large grazing wildlife away from the water.

3.3 The A-12 Pit Area

The A-12 Pit area is shown on Photo 3.3-1 and Drawing A 12. This pit is close to the Mine Camp facilities and has a very large pond in the eastern area of the pit. The water level of the pond varies seasonally. The water sources for this pond are from spring fed ponds to the east of A-12 and



Photograph No. 3.3-1
A 12 Pit
3/2/00

water seeps along the east and south highwalls. The flow into the A-12 pond has caused erosion features in the east and north highwalls.

The reclamation for the area was completed to an approved plan, but some of the water inflows to the pond have caused erosion problems that can be mitigated. Many of these specific corrections were being addressed between Simplot and FMC and BIA/BLM in the negotiations from 1995 through 1998. The 1997 Selenium Sampling Study found that the water in the A-12 Pit pond contained elevated levels of selenium. The A-12 pond contains approximately 44.5 to 89.0 million gallons of water depending on the time of the year. This volume of water is a major complication for any type of backfilling plan. The backfill volumes for even part of the required fill can not be obtained from pushing from the surrounding highwalls. Furthermore, pushing from the highwalls is less desirable due to the wet area in the south highwall where the majority of material is located. During the mining and reclamation work, the mining operations could not work equipment in the south highwall area and often had large dozers partially buried in the mud.

Another complicating factor is that the Sho-Ban Tribes' intended use for the Mine Camp area is for recreational purposes. Thus, any major work around the perimeter of A-12 must be sensitive to the Tribe's intended use of the Mine Camp area. The water from the spring fed ponds above A-12 is good quality and only comes in contact with the selenium bearing material when it runs into A-12. Diversion of this water would allow use down stream and reduce the amount of water in the pond. In fact, the water from the springs previous to mining flowed out past the Mine Camp area and into the natural drainage.

Several options were developed for mitigation of the A-12 pit.

Option 1 — Backfill Above the Seams, Divert the Water and Compact

This option essentially places a compacted fill in the pond bottom that will keep the water from

contacting selenium bearing material. The volume of water in the pond complicates this backfilling process. Another problem is the amount of fill required to cover the seams. The continuing flow of water into the pit pond from the ponds above plus the water from the seeps in the south highwall also impacts the option.

The execution of this option requires that the inflowing water be diverted and the water in the A-12 pond be removed prior to the backfill operation. This option will also require that the material for the backfill be hauled from approximately 3,000 feet from the south. The material in the waste pile to the south and near the old gravel pit seems an appropriate source of fill, but sampling and Procter testing will be required before this material is used.

The sequence of work would be:

- Build a permanent ditch that will divert the water from the ponds above A-12 and carry the water beyond the Mine Camp. A pond could also be constructed in the Mine Camp area for livestock and/or recreational use be consistent with others
- Pump the water in A-12 to the C Pit for holding until the backfilling is complete
- Build the haul road
- Place the backfill and shape the new bottom of the pond
- Compact the top layer of the backfill
- Dress up the highwalls, the haul roads and the borrow areas
- Pump the water back from the C Pit
- Revegetate all the effected areas
- Fence as required

The pumping of water out of the pit into another pit and then back to the A-12 pit will require further evaluation based on water quality data. Other alternatives for water discharge, such as treatment and direct discharge into nearby drainages or land application of water, should also be considered.

Option 2 — Divert Water and Fence



Photograph No. 3.4-1
NE Side of J culverts fix or pull out for fill
3/2/00



Photograph No. 3.4-2
NE side of J culverts fix or use for fill
3/2/00



Photograph No. 3.4-3
SW side of J culverts fix or use for fill
3/2/00



Photograph No. 3.4-4
SW side of J culverts
3/2/00



Photograph No. 3.4-5
JF Pit Waste Dump use to fill lower part of pond
3/2/00



Photograph No. 3.4-6
JF Pit Pond
3/2/00



Photograph No. 3.4-7
JF fill area-push to bottom
3/2/00



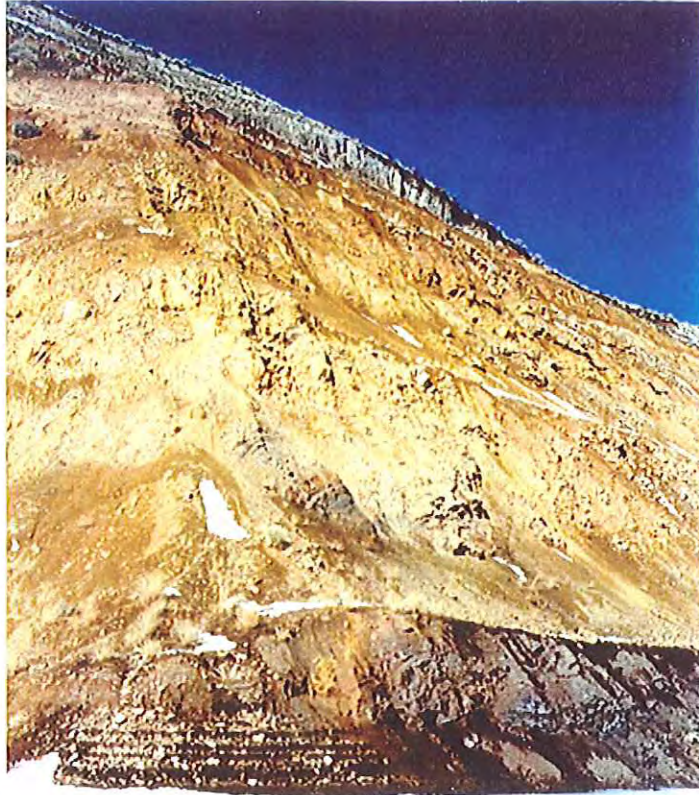
Photograph No. 3.4-8
Barren Material "Plug" JF Pit
3/2/00



Photograph No. 3.4-9
NW looking up along J Pit
3/2/00



Photograph 3.4-10
Looking N. into JF Pit
3/2/00



Photograph No. 3.4-11
JF Pond fault area-raises seam material 25' above other areas
3/2/00



Photograph No. 3.4-12
West side of J Pits
3/2/00



Photograph No. 3.4-13
West of J Pits
3/2/00



Photograph No. 3.4-14
West side of J Pits
3/2/00

The large area of the A-12 Pond and the large volume of required backfill may be offset by diverting the inflowing water, dressing up the highwalls and fencing the perimeter of the high-water level. If the major source of water for the A-12 pond is diverted, the level of the pond should decrease (the remaining water source would be seeps). It is possible that the pond may dry up during part of the year and that fencing could be used to keep large grazing wildlife and livestock away from remaining water. A complication of this approach is that evaporation of pond water may take a long period of time. Therefore, the fencing would need to extend beyond the current high-water line in order to keep the stock away until the water level drops.

The required steps to complete Option 2 are:

- Divert the water from the upper ponds.
- Dress up the erosion channels in the highwall.
- Fence around the perimeter and south highwall.
- Revegetate as required.

3.4 The JF Pit Area

The South 40 or the J Series pits were one of the last areas to be mined. The mining and reclamation methods were consistent with the other mining areas, essentially the previous pit was backfilled using overburden from the active pit. The JG area was reclaimed, but the haul road and associated culverts were left in place. The final pit, in a long series of pits, was the JF Pit. The JF Pit pond contains water that was shown to have elevated levels of selenium content when sampled in 1998. Photos 3.4-1 through 3.4-14 and Drawing JF show the location of the JF Pit and illustrate the current conditions of the area.

Previous discussions with the BIA/BLM outlined their concerns with the JF highwalls and the erosion on the haul road near the culverts. Both of these areas are shown in the photos. An area at the north end of the JF Pit was left with a slope steeper than 3:1 plus some of the material on the face of the existing slope may contain selenium-bearing material. Filling assumes using selenium

bearing material (waste shales) for lower fill and covering this material with “clean” fill material. The existing slope should be reduced for any option that is selected.

Option 1 — Backfill Above the Selenium Bearing Material and Fix the Culvert Area

Much of the fill material required to cover the selenium bearing zones may be available near the pit. The north end of the pit will provide approximately 40,000 lcy of fill and another 20,000 lcy may be available on the east and southwest sides of the pit. The total required fill is approximately 150,000 lcy, resulting in the need for an additional 90,000 lcy of material.

This option requires that the material from the haul road and culvert area be hauled approximately 3,000 feet and used as the remainder of the fill for JF Pit. Culverts and haul roads would be reclaimed to allow the natural drainage of Willow Creek to be redeveloped. The sequence of work would be:

- Push the selenium bearing material from the north end of the pit into the bottom of the existing pond.
- Push the non-selenium bearing material from the north, east, and southwest sides of the pit to cover the bottom of the pond.
- Transport the fill material from the haul road and place it in the pond to cover the selenium bearing seams.
- Reclaim the fill and borrow areas.

As mentioned, this option solves several of the existing concerns of the stakeholders by covering the pond, reducing the slope, reduction of some parts of the highwalls and removing the culverts. The final gradient of the pit bottom may be high enough to eliminate the pond and provide a drainage path through the pits.

Option 2 — Push Fill from the North End and Cast Blast from the East Wall

The idea of reducing the highwall by cast blasting has been discussed for the J Series Pits (field notes from site visit with BLM/BIA and Larry

Raymond). This discussion suggested that the material in the east highwall is not consolidated enough for cast blasting. Excavation of material from the west highwall would likely result in slope failure (Photos 3.4-12 through 3.4-14). The east highwall has some loose material on the top and at the toe of the slope within the pit. Cast blasting is not effective when the material is loose or there is loose material at the toe of the slope. The cast blasting option may be effective if the loose material is removed from the top and toe. The merits of this option requires an evaluation by a blasting contractor. The work sequence for this option is:

- Push the fill from the north end of the pit to the west side of the pond.
- Push the loose material from the east side and toe of the slope off the solid rock in the east highwall.
- Cast blast the east highwall into the pit.
- Dress all areas with dozers.
- Reclaim the fill, blast and borrow areas.

Obtaining onsite input from blasting experts would be useful and possibly may make this the option of choice for this pit. The cast blasting option does not fix the problem with the haul road and culverts. The final configuration of the pit may eliminate the pond and provide access along the pit bottom.

Option 3 — Push Fill from North End and Fence

This option is similar to the fencing options for the other areas except that the material in the north is re-sloped to a 3:1 gradient to comply with the Reclamation Plan. It has the problem of fence maintenance and will not keep all wildlife out. The sequence for this option is:

- Push the fill in the North to 3:1 slope
- Fence the perimeter (approximately 1,540 feet)

3.5 The Z Pit Area

The Z Pit is located on the eastern boundary of the Gay Mine leases. The physical appearance is

presented in Photos 3.5-1 through 3.5-10 and Drawing Z. The pit bottom is mostly covered with water and the sides of the pit are a combination of rock highwalls and fill material. The west side has a large fill area that is dumped at the angle of repose (Photo 3.5-2) with exposed seams (Photo 3.5-8). The circumference of the pond is approximately 1,021 feet and the top of the seam on the west side is 45 feet above the water level. On the east side, the seam is covered by fill material, but the seam is probably 10 feet above the water level.

The potential fill sources for the pit are the chert beds above the seam on the west and the fill areas on the east and south. If there is insufficient material on the highwalls, then material will need to be hauled approximately 3,000 feet and placed in to the pit bottom. The water will need to be pumped out of the pit bottom prior to backfilling.

Option 1 — A 3:1 Slope on the West and 12 foot cover on the East

The pit bottom and fill zones volumes were estimated from a final pit profile map that was generated by the Gay Mine. The profile was assumed to be the final mined levels and the fill was calculated by splitting the fill area into two halves and using end area geometry for the volumes. The actual volumes of fill may be less when the actual dimensions can be calculated from survey data or new maps. Reductions in fill volumes may allow all of the required material to be pushed in from the highwalls or at least reduce the volume that needs to be hauled to the pit.

The sequence of work for this option would be:

- Pump the water to the Y Pit for holding until backfill is complete.
- Push the material from the west highwalls to develop a 3:1 slope that starts above the seams.
- Load, haul and place the east side fill.
- Compact the top 1-foot of fill in the pond bottom.
- Pump water back from Y Pit.
- Revegetate all borrow and fill areas.

Option 2 — All Dozer Pushing from the Highwalls

This option assumes that pushing with dozers can move in all the required material. The average push length becomes 300 feet and there is still a need to remove the water prior to backfilling.

The work sequence would be:

- Pump the water to Y Pit for storage.
- Push the 132,000 lcy from the west side of the pit.
- Push the remainder of the fill from the east and south highwalls and then Revegetate all areas.
- Compact the top 1-foot of the fill area.
- Pump the water back from the Y Pit.

Option 3 — Fencing the Area

Again, the option is to fence off the pond area and dress up the erosion areas with dozers.



Photograph No. 3.5-1
Z Pit from north extension
3/2/00



Photograph No. 3.5-2
Z Pit looking west to Y pits
3/2/00



Photograph No. 3.5-3
Millshale pile on east side of Z Pit
3/2/00



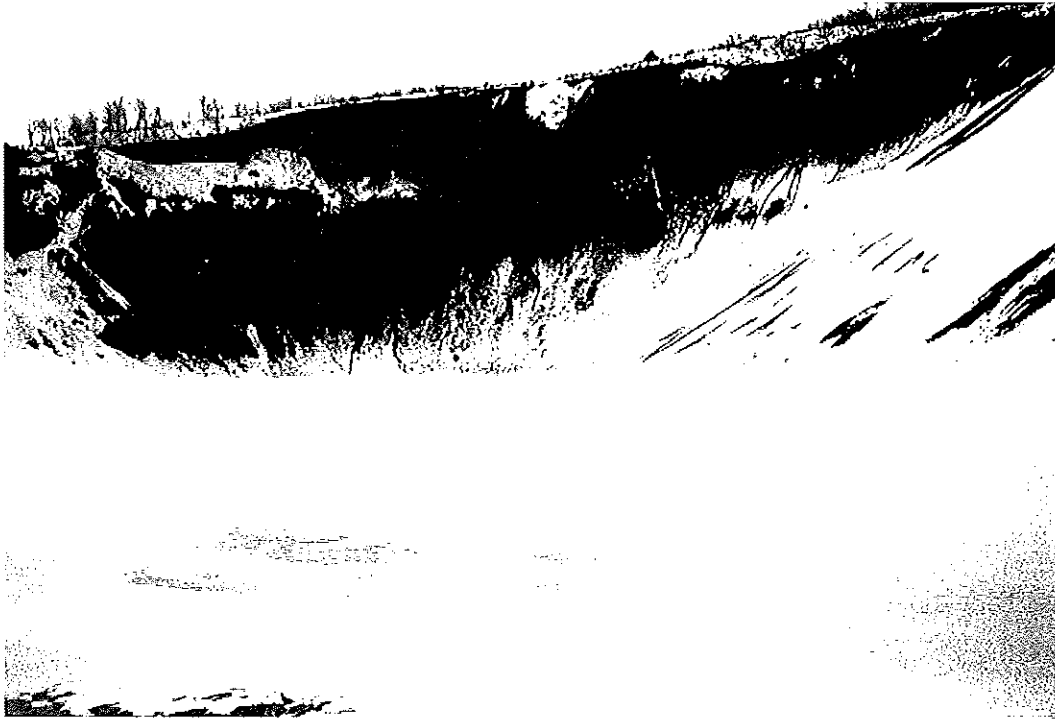
Photograph No. 3.5-4
Z Pit looking west at back-fill wall
3/2/00



Photograph No. 3.5-5
Z Pit shows seam in west high wall
3/2/00



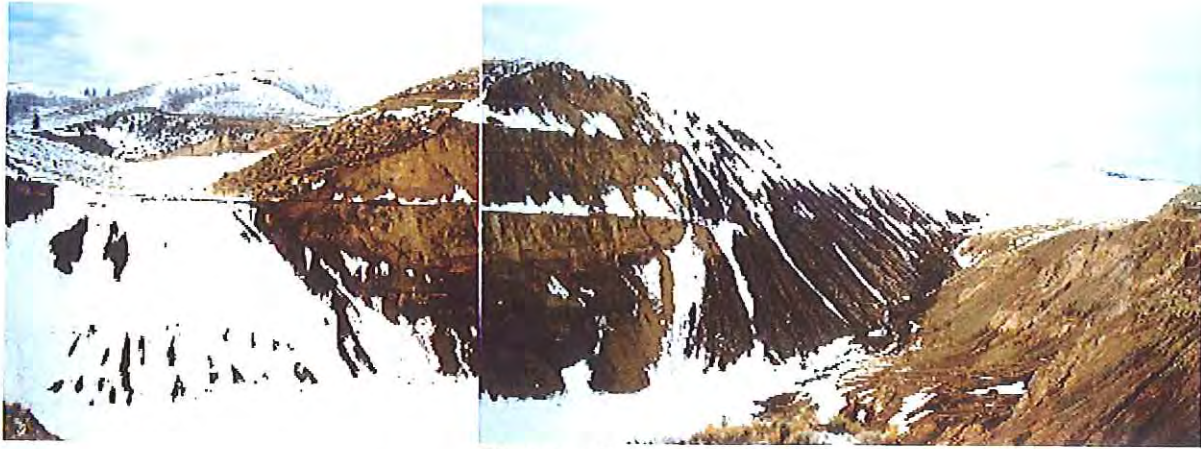
Photograph No. 3.5-6
Z Pit south wall
3/2/00



Photograph No. 3.5-7
Z Pit looking south from north edge of water level
3/2/00



Photograph No. 3.5-8
Z Pit west wall showing chert above seam
3/2/00



Photograph No. 3.5-9
Z Pit looking west from top of east wall
3/2/00



Photograph No. 3.5-10
Z Pit looking east
3/2/00

Section 4.0

Gay Mine Lease Holding Summary

The Gay Mine's lease holdings are complex and numerous. The mine area is on Tribal lands and various individuals of the Tribes are allocated parcels of land within the Tribal boundaries. The Gay Mine consists of approximately 60 leases that cover over 8,500 acres. On some of the leases there was never any mining activity and on many others the land has been reclaimed to approved plans yet none of the leases have been approved for relinquishment. There are several areas where additional reclamation has been requested prior to the release of the land, but this applies to less than half of the acreage.

Simplot and FMC held the leases either jointly or individually. An approach to the release of the lands is to categorize each lease by status of land use i.e., never used, reclaimed, still in progress, etc.

Based on a preliminary analysis, the leases can be separated into four categories:

Category I. — Areas that were never mined.

Category II. — Near mined areas, but minimal disturbance.

Category III. — Areas that were reclaimed to plans or were pre-NEPA.

Category IV. — Areas where the status is in question.

The leases in each category are presented in Tables 4-1, 4-2, 4-3, and 4-4 and the general location of each category is shown on Figures 4-1 and 4-2. A more detailed study needs to be completed to define the specifics of each lease, but the tables and the map defines significant areas that were never disturbed or have been reclaimed. From this preliminary analysis, the leases could be released in groups with the timing being:

Categories I and II. — Immediate release possible.

Category III. — On-site visit with Agency and Tribal representatives to confirm that the reclamation is complete.

Category IV. — After the area is completed to an approved final plan.

This partial release sequence will help expedite the final reclamation phase and rightfully returns the land to the owners. The approximate number of acres released is included in Tables 4-1 through 4-4.

Table 4-1. Gay Mine Lease Categories
Category I: Areas That Were Never Mined

Owner	Lease Number	Allotment/Tract	Acres
FMC	182	1813	40
FMC	183	1376	40
FMC	184	355	20
FMC	185	356	20
FMC	200	388	40
FMC	201	967	80
FMC	213	683 parcel 3	40
Joint	91	1813	120
Joint	92	844	160
Joint	93	845	160
Joint	155	1010	160
Joint	158	968	160
Joint	208	1329	150.78
JR Simplot	212	1256 parcel 10	80
JR Simplot	212	305 parcel 11	160
JR Simplot	212	1334 parcel 13	40
JR Simplot	212	1346 parcel 12	120
JR Simplot	212	683 parcel 3	40
Total			1,360.78

Table 4-2. Gay Mine Lease Categories
Category II: Near Mined Areas But Minimal Disturbance

Owner	Lease Number	Allotment/Tract	Acres
FMC	198	975	40
FMC	199	971	80
Joint	80	838 JI	160
Joint	85	233 JH	160
Joint	86	628 JB	80
Joint	97	278	160
JR Simplot	86-87	NA	720
JR Simplot	88-86	122 & 125	260
Total			1,660

Table 4-3. Gay Mine Lease Categories
Category III: Areas That Were Reclaimed to Plan and/or Pre-NEPA

Owner	Lease Number	Allotment/Tract	Acres
FMC	187	345	40
FMC	188	348	40
FMC	189	348	80
FMC	191	346	120
FMC	192	495	40
FMC	193	495	40
FMC	195	350	80
FMC	195	352	80
FMC	196	352	40
FMC	197	636	160
FMC	213	495 parcel 6	80
FMC	213	351 parcel 8	80
Joint	1203	Acquired	440
Joint	82	1064	80
Joint	83	625	160
Joint	119	346	40
JR Simplot	209	NA	194.22
JR Simplot	212	351 parcel 9	80
JR Simplot	212	351 parcel 22	40
JR Simplot	212	607 parcel 8	80
JR Simplot	212	1801 parcel 15	80
JR Simplot	212	683 parcel 14	40
Total			2,114.22

Table 4-4. Gay Mine Lease Categories
Category IV: Areas Where The Status Is In Question

Owner	Lease Number	Allotment/Tract	Acres
FMC	178	605	80
FMC	179	603	80
FMC	186	350	40
FMC	190	801	80
FMC	210	NA	120
Joint	84	826.5	80
Joint	211	NA	50
JR Simplot	86-41	684	120
JR Simplot	91-113	826B	20
JR Simplot	2645	971	10
JR Simplot	2201	NA	80.48
JR Simplot	217	279	40
JR Simplot	180	685	10
JR Simplot	181	648	160
JR Simplot	214	604	160
JR Simplot	89-152B	T949	80.58
JR Simplot	89-153B	T3176	80
JR Simplot	89-154B	849	20
JR Simplot	2214B	848	0.15
JR Simplot	95-104B	648B	30
Total			1,341.21

Note: The remaining acreage is contained in Leases 212 and 213.

Section 5.0

Summary and Recommendations

This report presented a preliminary evaluation of reclamation alternatives for partial backfill of four mine pits at the Gay Mine. In addition, pertinent issues regarding final reclamation at the site were discussed in light of concerns regarding selenium. Finally, issues regarding lease holdings were presented.

A meeting with BLM, BIA, and the Tribe is recommended to determine their expectations regarding reclamation of the pit lakes and the overall final phase of reclamation at the Gay Mine. It is imperative that the stakeholders work closely together throughout this process so that final reclamation of the mine is achieved.

Section 6.0

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